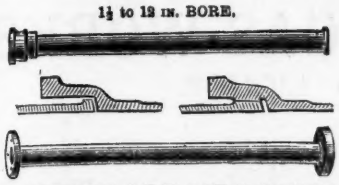
# THE JOURNAL OF GAS LIGHTING
## WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LX. No. 1530.] LONDON, SEPTEMBER 6, 1892. [44TH YEAR. PRICE 6d.



GAS AND WATER PIPES

1¼ to 12 IN. BORE.



THOMAS ALLAN & SONS,

Bon Lea Foundry,

SOUTH STOCKTON-ON-TEES.

ALSO MANUFACTURERS OF SANITARY & RAIN-WATER PIPES, HOT WATER PIPES, STABLE FITTINGS, RANGES, STOVES, And GENERAL CASTINGS.

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Telegrams:
"BONLEA, STOCKTON-ON-TEES."
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— ESTABLISHED 1830. —

PARKER & LESTER,

Manufacturers & Contractors.

THE ONLY MAKERS OF

PATENT ANTIMONY PAINT,

Parker's Imperial Black Varnish,

*Oxide Paints, Oils, and General Stores for Gas and Water Works.*

WORKS:
ORMSIDE STREET, OLD KENT ROAD,
LONDON.

WOLSTON'S

TORBAY PAINTS

*Special Quotations to Gas Companies.*

DARTMOUTH, DEVON.

Lanemark Coal Co.,

LIMITED.

LANEMARK CANNEL

AND GAS COALS.

*Quotations and Analysis on application to*

LANEMARK COLLIERY,

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Shipping Ports: All the principal Scotch Ports.

# GASHOLDERS

## C. & W. WALKER

Are now erecting a four-lift Holder of about 8 MILLION cubic feet,

at the Beckton Gas-Works, London.

## PURIFIERS;

## PURIFYING MACHINES;

$CO_2$ AND TAR-EXTRACTING WASHERS; SCRUBBERS;

SULPHATE & SULPHUR PLANT;

PATENT SELF-SEALING RETORT MOUTHPIECES;

LIFTING APPARATUS; CENTRE AND FOUR-WAY VALVES;

SOLE MANUFACTURERS OF WECK'S PATENT CENTRE-VALVE;

PATENT TAR PLANT; CONDENSERS;

SLIDE VALVES; TAR BURNERS; &C., &C.

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"FORTRESS DONNINGTON." "FORTRESS LONDON."—Telegraphic.

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## FLETCHER AND MURPHY,

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Manufacturers of

**IMPROVED CONSUMERS' WET GAS-METERS**

IN CAST-IRON CASES,

**THE UNVARYING WATER-LINE GAS-METER,**

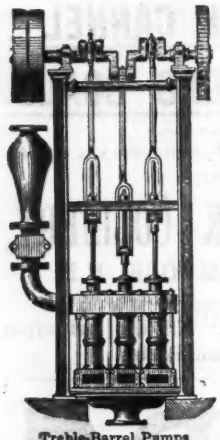
AND

**IMPROVED DRY GAS-METERS.**

**SPECIALITY: PATENT CASH PREPAYMENT METERS.**

# STEAM & HAND PUMPS FOR GAS-WORKS,

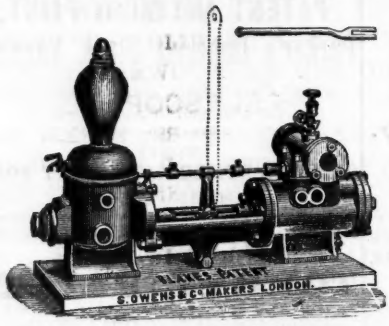
FOR PUMPING TAR, WATER, AND LIQUOR.



Treble-Barrel Pumps in Frame.

Syphon Pump.

Double-Barrel Force-Pump in Frame.




BLAKE'S
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**STEAM PUMPS.**
**20,000** IN USE.

Improved Double Action Pump.

Cast-Iron Hand-Pump.

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**S. OWENS & CO.,** Hydraulic, Gas, & General Engineers, WHITEFRIARS ST., LONDON, E.C.

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*S. O. and Co.'s New Catalogue of Gas Apparatus and General Machinery can be had on application.*

# NEWTON, CHAMBERS, & CO., LIMITED,

**THORNCLIFFE IRON-WORKS, near SHEFFIELD,**

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**SLIDE VALVES,**
WITH RACK & PINION
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Internal or External
SCREWS, of all Sizes.
**GASHOLDERS,**
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Gasholder Tanks.

**CAST-IRON RETORTS,**
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*And Retort-House Appliances*
of every description.
Iron Roofs, Columns, Girders, Floor Plates and Tools, &c.

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**CONDENSERS,**
**SCRUBBERS, & WASHERS,**
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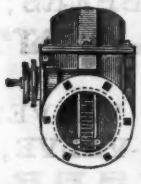
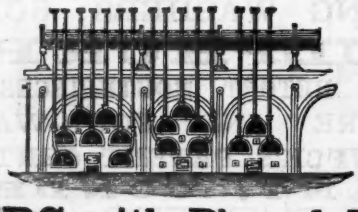
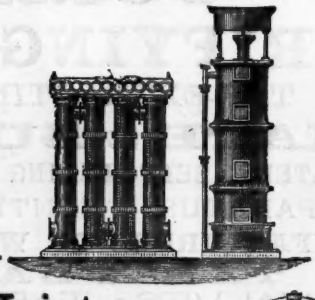
**CENTRE VALVES**
for working Purifiers.
Also Bye-Pass & Stop Valves.







**PURIFIERS with Planed Joints,**
HAND and HYDRAULIC LIFTING GEAR, CAST-IRON MAINS and SPECIALS,
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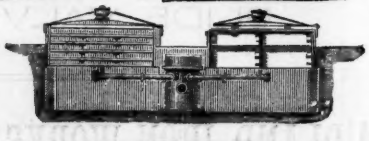

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Pig Iron (*Special Quality*) for ENGINE CYLINDERS, &c.

**GAS COAL FAMOUS FOR ITS UNRIVALLED EXCELLENCE.**

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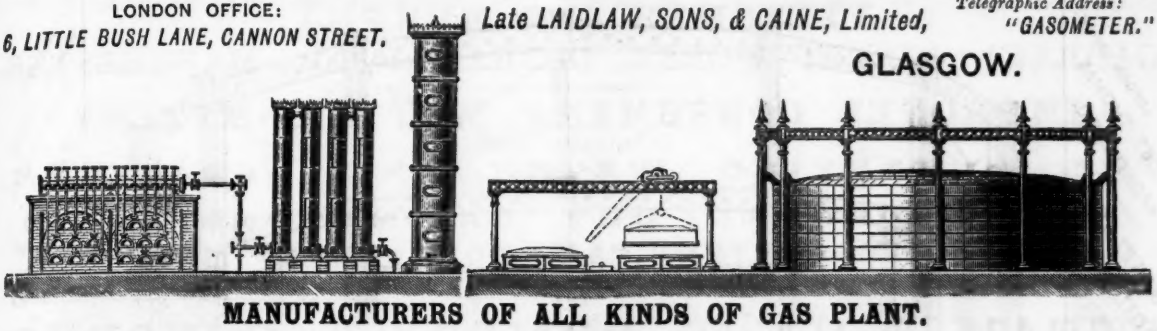
*Telegraphic Address:*
*"GASOMETER."*

GLASGOW.



**MANUFACTURERS OF ALL KINDS OF GAS PLANT.**

RETORT-BENCH FITTINGS; SIEMENS'S REGENERATIVE AND ORDINARY FURNACES;
CONDENSERS, EXHAUSTERS, AND ENGINES; SCRUBBERS, WASHERS;
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IRON ROOFING, MARKET BUILDINGS, BRIDGES, GIRDERS, STEAM BOILERS;
PROMENADE PIERS AND LOADING WHARVES.

**MANUFACTURERS OF OIL PLANT OF EVERY DESCRIPTION.**

HENDERSON'S Patent Retorts, Condensers, Stills, Cast and Wrought Iron Tanks, Ammonia Stills, Wrought-Iron Gas-Mains, &c., &c.

DESCRIPTIVE SPECIFICATIONS AND ESTIMATES ON APPLICATION.

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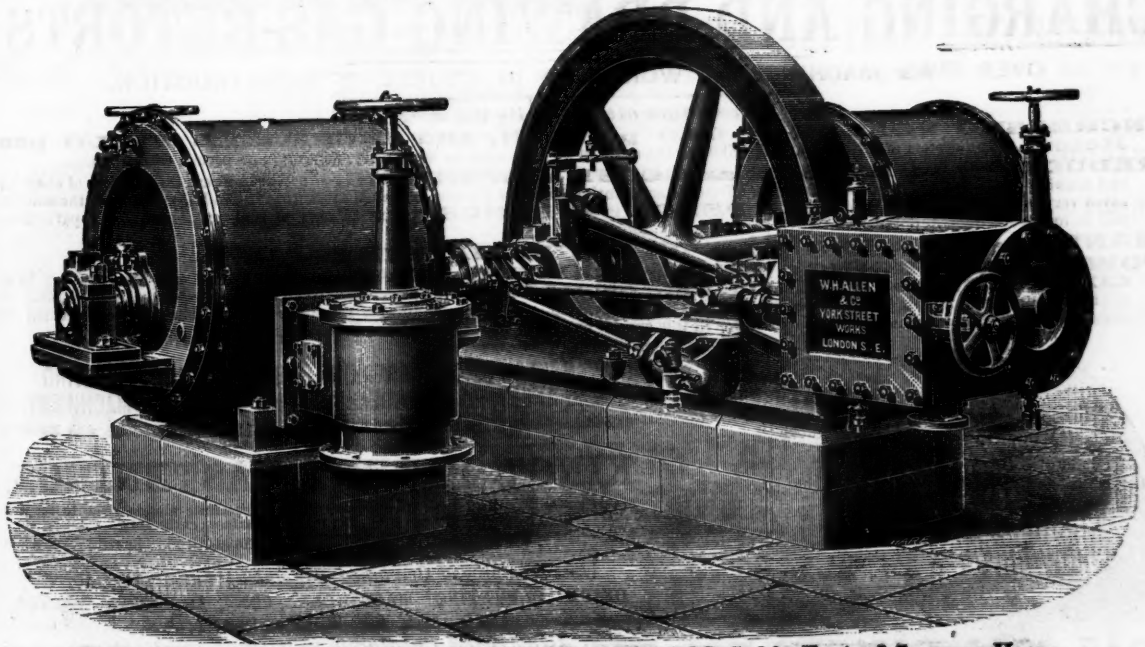
MAKERS OF THE MOST IMPROVED FORM OF

# GAS EXHAUSTING MACHINERY.

BEALE'S PATENT—ALLEN'S COMBINED SYSTEM.




**Pair of Non-Oscillating Exhausters, passing 200,000 Cubic Feet of Gas per Hour.**

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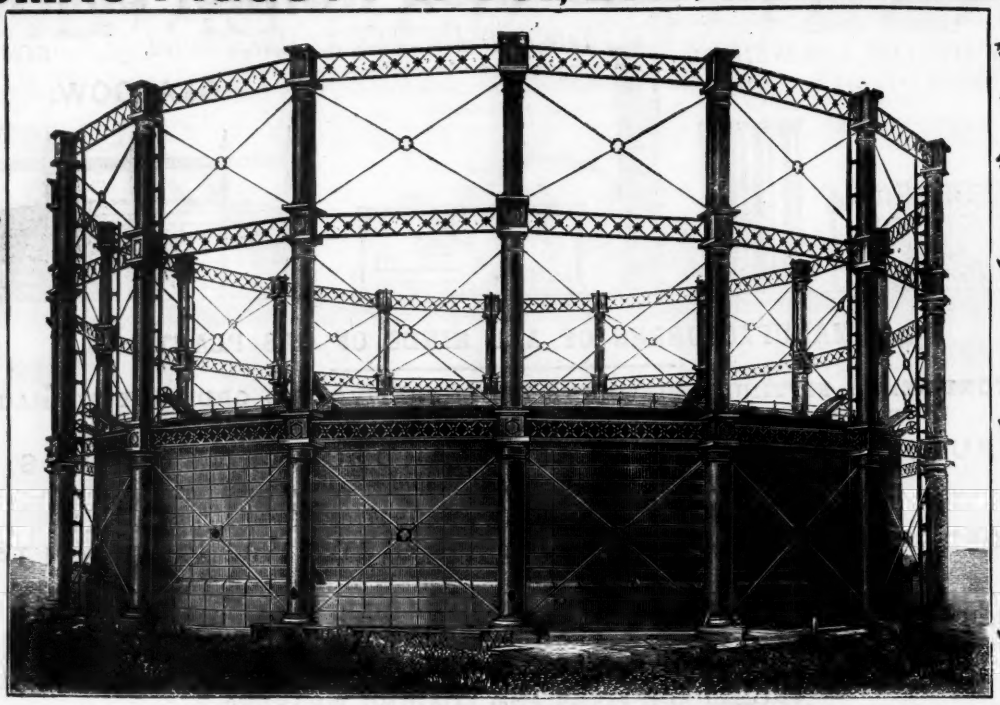
GAS PLANTS, BOILERS, ENGINES, PUMPS, ROOFS, RETORT. FITTINGS, ETC.



TELEGRAPHIC ADDRESS: ATLAS, BIRMINGHAM.

WELDED & RIVETED PIPES, MAINS, RETORT-LIDS, WROT & CAST TANKS, PURIFIERS.

OVER 500 GASHOLDERS HAVE BEEN SUPPLIED AND ERECTED,

INCLUDING THOSE SUPPLIED TO THE FOLLOWING GAS COMPANIES AND CORPORATIONS:

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|---|---|---|---|---|---|---|
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| BELFAST. | BOMBAY. | BRISBANE. | HARTLEPOOL. | LIVERPOOL. | READING. | STOCKHOLM. |
| BECKTON. | BRADFORD. | CARDIFF. | LEEDS. | NOTTINGHAM. | RIO GRANDE. | SYDNEY. |
| BIRMINGHAM. | BRIGHTON. | COVENTRY. | LEICESTER. | OLDHAM. | SOUTH METRON. | VIENNA. |

# WEST'S GAS IMPROVEMENT Co., Ltd.,

*Engineers, Ironfounders, & Contractors,*

ALBION IRON-WORKS, MILES PLATTING, MANCHESTER,

MANUFACTURERS OF

## WEST'S PATENTED MACHINERY FOR CHARGING AND DRAWING GAS-RETORTS

OVER **240** MACHINES AT WORK AND IN COURSE OF CONSTRUCTION.

*Advantages attending its use are:*

**INCREASED VOLUME of GAS per TON, and INCREASED YIELD per Retort.**—The system of breaking and distributing the coals in an even layer in the retorts effecting more perfect carbonization.

**REDUCTION in LABOUR and COST of WORKING.**—In Works where this System of charging and drawing Retorts is adopted, there has been effected a substantial saving in the cost of Gas Manufacture in the Retort-House; the amount saved varying in different Gas-Works from **8 PENCE** to **15 PENCE per Ton** of coal carbonized. Full particulars will be forwarded upon application to W. G. I. Company, Limited.

**MANUAL CHARGING AND DRAWING MACHINES.**

**POWER CHARGING AND DRAWING MACHINES, driven by COMPRESSED AIR, STEAM, or ROPE.** The power machines are applicable to circular, oval, or Ω-shaped retorts and mouthpieces, and are the most perfect, economical, efficient, and durable machines made. They are constructed on principles founded by long and extensive experience in this special branch of gas engineering and the manufacture of gas.

MAKERS OF COAL BREAKING, ELEVATING, AND CONVEYING MACHINERY, COKE BREAKING AND WASHING MACHINERY.

Sole Makers of **CIRCULAR, OVAL, or Ω-shaped MOUTHPIECES** with Morton's Self-Sealing Lids, fitted with

## KING'S PATENT FASTENINGS,

secure a very tight joint; and at the same time the eccentric motion given to the Lid effectually removes the Tar from the surfaces of the Joint.

N.B.—The whole of these Fittings are made of Wrought Iron. Several Thousands in use.

*West's Improved Combined Regulating Liquor Seal Valve.*

**OXIDE ELEVATING MACHINERY, COKE BARROWS, VALVES, AND ALL GAS-WORKS PLANT, &c.**

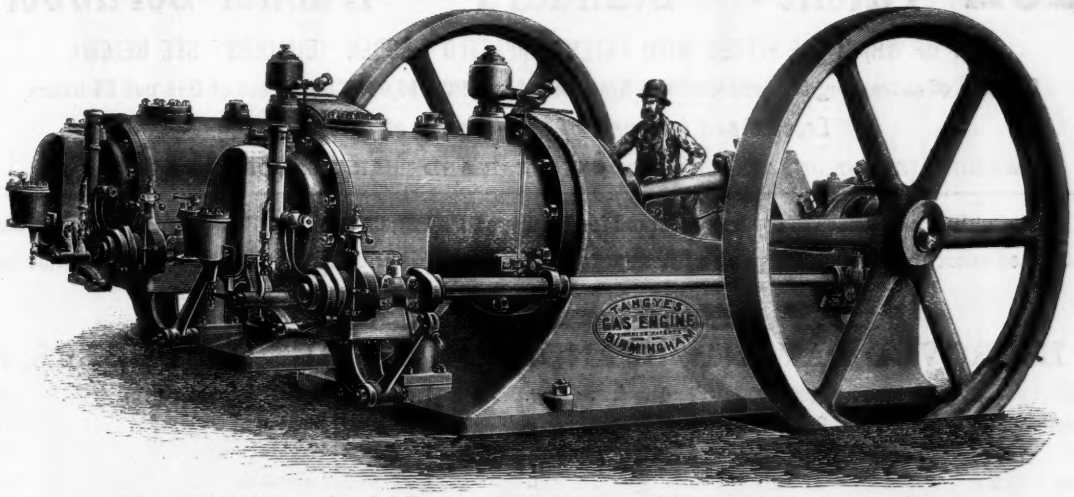
***Illustrated Catalogue sent upon application.***

Mr. JOHN WEST, M.Inst.C.E. *Managing Director.*

# TANGYES' GAS-ENGINE

"OTTO" PRINCIPLE. PINKNEY'S PATENTS.

Messrs. Tangye have laid down special Plant and Tools for the manufacture of these Engines, and are able by their system of MULTIPLE MANUFACTURE and of WORKING TO GAUGE to turn them out in the best possible style.




The 70-H.P. (Nom.) Coupled Engine, giving 172 Actual H.P., and indicating 200 H.P.
Single Engines from ¼ to 146 Actual H.P. (=170 Ind. H.P.) and Coupled Engines from 86 to 292 Actual H.P. (=340 Ind. H.P.)

APPLY FOR ILLUSTRATED AND DESCRIPTIVE CATALOGUE OF GAS-ENGINES TO

**TANGYES LIMITED, BIRMINGHAM.**

ALSO AT

LONDON, NEWCASTLE, MANCHESTER, GLASGOW, SYDNEY, MELBOURNE, JOHANNESBURG, GENOA, BILBAO, and ROTTERDAM.

Telegrams: "TANGYES, BIRMINGHAM." No. 81 E.

# MORRIS & CUTLER'S PATENT CONDENSER

**IN USE AT OVER 70 WORKS.**

NOW UNDER CONSTRUCTION FOR

**COLCHESTER,**
**BELFAST,**
**BRAZIL,**
**HONG-KONG,**
**HARROGATE,**
**MANCHESTER.**

# CUTLER'S PATENT WATER-VALVES,

ESPECIALLY SUITABLE FOR PURIFIERS.

# CUTLER'S PATENT GUIDE-FRAMING,

STRONG, SAFE, CHEAP.

*EVERY REQUIREMENT FOR GAS-WORKS SUPPLIED.*

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**S. CUTLER & SONS,**

PROVIDENCE WORKS, MILLWALL, LONDON.

# KIRKHAM, HULETT, & CHANDLER, LIMITED.

[SIDNEY HEESEY, Managing Director.] [J. CHANDLER, Engineer.]

## 452 Patent "Standard" Washer-Scrubbers

**(107 OF WHICH ARE FITTED WITH PATENT IMPROVED WOODEN "BUNDLES" SEE BELOW),**

**Capable of extracting the whole of the Ammonia from 428,645,000 Cubic Feet of Gas per 24 hours,**

*Erected and in course of construction at present date.*

WEIGHT IN MOTION, AND CONSEQUENT WEAR AND TEAR, REDUCED TO A MINIMUM.

**The following List comprises the orders received for Improved PATENT "STANDARD" WASHER-SCRUBBERS constructed according to the Company's latest patent, and Renewals effected by the application of same to old pattern Machines.**

### 67 IMPROVED PATENT "STANDARD" WASHER-SCRUBBERS, viz:-

| | | | | | |
|---|---|---|---|---|---|
| Birmingham | 5,000,000 | Kilmarnock | 1,000,000 | Lyons-Vaise (France) | 525,000 |
| Beckton | 3,500,000 | Dover | 1,000,000 | Barry and Cadoxton | 500,000 |
| ,, | 3,500,000 | Colchester | 1,000,000 | Workington | 500,000 |
| Kensal Green | 3,000,000 | Cambridge | 1,000,000 | Lowestoft | 500,000 |
| ,, | 3,000,000 | West Bromwich | 1,000,000 | Newton-le-Willows | 500,000 |
| Liverpool | 3,000,000 | Luton | 1,000,000 | Manchester | 400,000 |
| ,, | 3,000,000 | Alger (Algieria) | 875,000 | Erfurt (Germany) | 400,000 |
| Croydon | 3,000,000 | Valencia (Spain) | 875,000 | St. Chamond (France) | 350,000 |
| West Ham | 3,000,000 | Barcelona (Spain) | 875,000 | Santander (Spain) | 350,000 |
| Rochdale | 3,000,000 | ,, ,, | 875,000 | Atlas Steel Works, Sheffield | 250,000 |
| Paris | 3,000,000 | Nice (France) | 875,000 | Bangor | 250,000 |
| ,, | 3,000,000 | Stockport | 800,000 | Lille (France) | 250,000 |
| Glasgow | 2,500,000 | Magdeburg (Germany) | 750,000 | Melun ,, | 210,000 |
| ,, | 2,500,000 | Altoona (U.S.A.) | 750,000 | Arles ,, | 210,000 |
| Manchester | 2,500,000 | Smethwick | 750,000 | Valencia (Spain) | 200,000 |
| Leicester | 2,250,000 | Schneider-Creusot Works | | ,, ,, | 200,000 |
| Swansea | 2,000,000 | (France) | 735,000 | Vercelli (Italy) | 200,000 |
| Bordeaux | 2,000,000 | Valparaiso (Chili) | 600,000 | Rawmarsh | 200,000 |
| Melbourne | 1,500,000 | Halle (Germany) | 600,000 | Baccarat (France) | 175,000 |
| Charlottenburg (Germany) | 1,500,000 | Elberfeld ,, | 600,000 | Hitchin | 150,000 |
| Derby | 1,500,000 | ,, ,, | 600,000 | Sydney | 100,000 |
| ,, | 1,000,000 | Nancy (France) | 525,000 | Balson-Chateauroux (France) | 70,000 |
| ,, (Midland Rly. Works) | 1,000,000 | ,, ,, | 525,000 | | |

### RENEWALS TO 40 PATENT "STANDARD" WASHER-SCRUBBERS, viz:—

| | | | | | |
|---|---|---|---|---|---|
| Birmingham | 5,000,000 | West Ham | 1,500,000 | Hampton Wick | 500,000 |
| Nine Elms (in part) | 3,000,000 | Nottingham | 1,500,000 | Kingston-on-Hull | 400,000 |
| Vauxhall ,, | 3,000,000 | Melbourne | 1,500,000 | Weston-super-Mare (in part) | 400,000 |
| Dublin | 3,000,000 | ,, | 1,500,000 | Deventer, Holland ,, ,, | 350,000 |
| Shoreditch (in part) | 2,500,000 | Crewe (L. & N.W.R. Co.) | 1,250,000 | Enfield | 300,000 |
| Beckton | 2,500,000 | Beckton | 1,250,000 | Harrow | 250,000 |
| Manchester | 2,500,000 | ,, | 1,250,000 | Buxton | 250,000 |
| Bromley | 2,000,000 | ,, (in part) | 1,250,000 | Quebec, Canada (in part) | 250,000 |
| Pimlico (in part) | 2,000,000 | Bradford | 1,250,000 | Reigate | 200,000 |
| Plymouth | 2,000,000 | Maidstone | 1,000,000 | Newmarket | 150,000 |
| Cheltenham | 2,000,000 | Smethwick | 750,000 | Leominster | 150,000 |
| Croydon | 1,500,000 | Heywood | 600,000 | Kidsgrove | 100,000 |
| Edinburgh | 1,500,000 | Heckmondwike | 500,000 | Driffield | 100,000 |
| Hastings | 1,500,000 | | | | |

**All New Patent "Standard" Washer-Scrubbers are fitted with the Company's Patent Improved Wooden "Bundles" or Washing Devices, which can be readily fitted to old pattern Machines.**

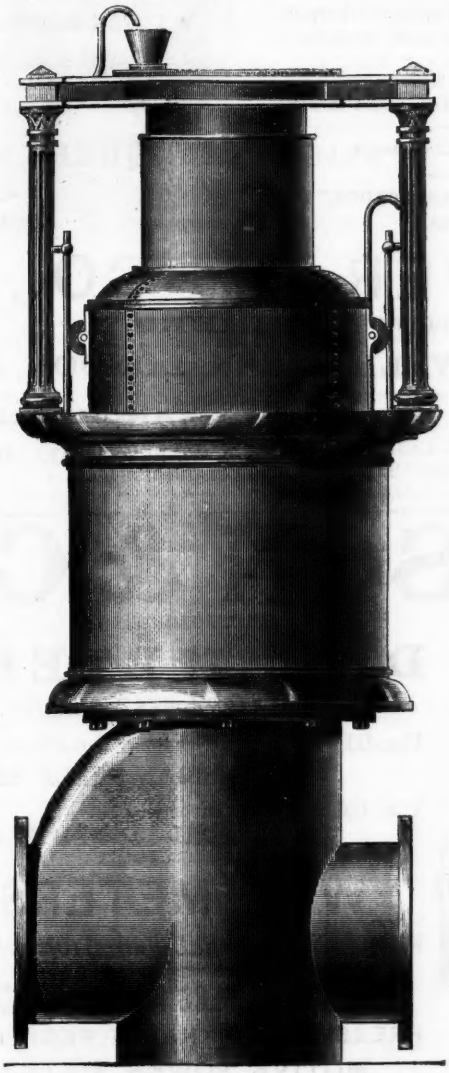
*Address: 3 & 4, Palace Chambers, Bridge St., Westminster, London, S.W.*

# WM. COWAN'S PATENT GAS GOVERNOR.

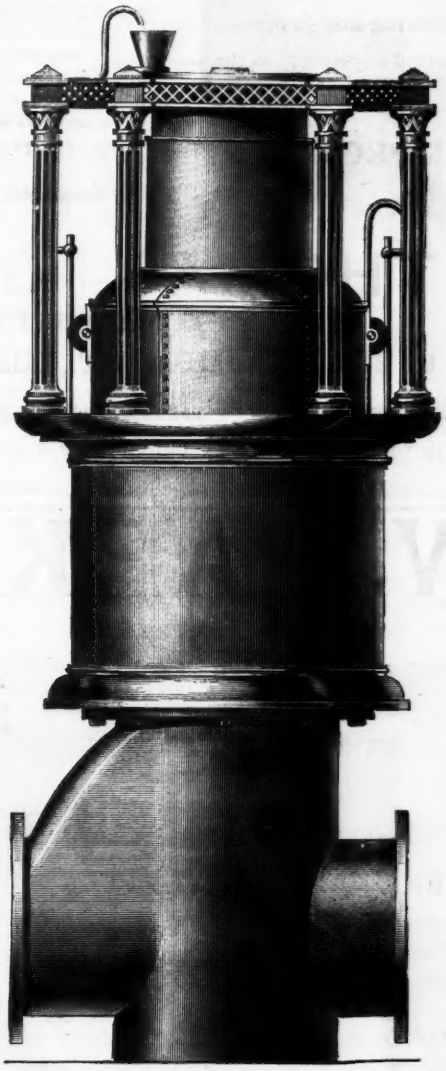
This Governor is a perfect regulator of gas pressure. Unaffected by **even the most extreme and sudden changes of inlet pressure or of draught,** it maintains, without variation, the pressure it is adjusted to give.

This result is attained by balancing the influence of the inlet pressure on the valve-base by an equivalent force, operating *above the roof of the bell.*

Another and a great advantage is the **unique water-loading arrangement,** which is made perfect and complete by the use of **WM. COWAN'S PATENT "STATIONARY SYPHON."**



STATION GOVERNOR with TWO PILLARS.



STATION GOVERNOR with SIX PILLARS AND GIRDERS.

The water loading is further utilized to maintain automatically the depth of the "seal" in the compensating slide. While the loading is going on, the water is first delivered into the slide, from which it overflows into the loading tank below.

We have supplied these Governors to many of the most important Gas-Works in the United Kingdom and abroad, to the Engineers of which we shall have pleasure in referring those who may favour us with inquiries.

## W. & B. COWAN,

ESTABLISHED 1827

SMITH SQUARE WORKS, WESTMINSTER, LONDON, S.W.
TELEPHONE No. 3250.
"DISC LONDON."

DUTTON STREET WORKS, MANCHESTER.
TELEPHONE No. 1543.
"DISC MANCHESTER."

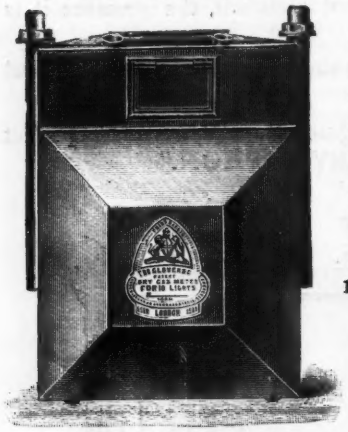
BUCCLEUCH STREET WORKS; EDINBURGH.
TELEPHONE No. 732.
"DISC EDINBURGH."

TELEGRAPHIC ADDRESSES:

[ESTABLISHED 1844.] **ORIGINAL MAKERS.** [ESTABLISHED 1844.]

LONDON, 1851. NEW YORK, 1853. PARIS, 1855. LONDON, 1862. DUBLIN, 1865. PARIS, 1867.

THE SIX MEDALS AWARDED TO THOMAS GLOVER'S PATENT DRY GAS-METERS;
*The latter being the Highest Award for Dry Gas-Meters at the Paris Exhibition, 1867. Since then we have not Exhibited FOR PRIZES.*



1st.—Are a remedy for all the defects of Wet Meters.
2nd.—Are suitable for all Climates, whether hot or cold.
3rd.—Incur no loss of Gas by Evaporation.
4th.—Cannot become fixed by Frost, however severe.
5th.—Are the most accurate and unvarying measurers of Gas.
6th.—Prevent jumping or unexpected extinction of the Lights.
7th.—May be fixed either above or below the level of the Lights.
8th.—Cannot be tampered with without visibly damaging the outer case.
9th.—Will last much longer than Wet Meters.
10th.—Will not cost more than one-half for repair that Wet or Water Meters do.

Are upheld for five years without charge.

**Telegraphic Address: "GOTHIC LONDON."**
**Telephone No. 6725.**

# THOMAS GLOVER & CO.,

## DRY GAS-METER MANUFACTURERS,

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|---|---|---|---|
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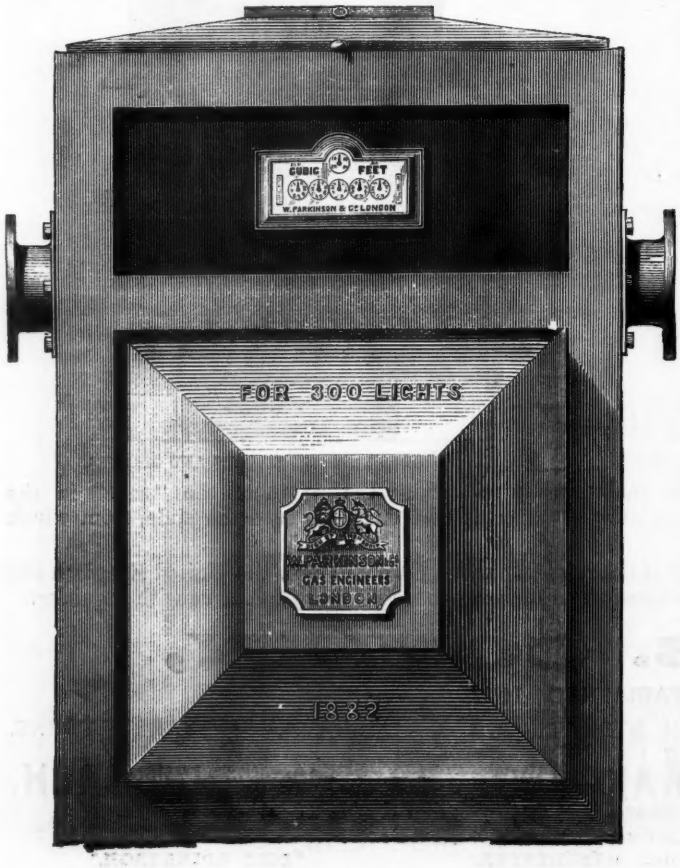


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[See also Advt., p. 452.

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THE

# JOURNAL OF GAS LIGHTING,

## WATER SUPPLY, & SANITARY IMPROVEMENT.

*TUESDAY, SEPTEMBER 6, 1892.*


### The Examinations in "Gas Manufacture."

THE year's record of the work of the City and Guilds of London Institute for the Advancement of Technical Education ends for us with the appearance in the JOURNAL last week of the two question papers. We have yet to learn the proportion of passes to candidates, and a few other statistics from the usual report upon the technological examinations, which comes out during the present month; but practically all is known when the names of the successful candidates and the papers are published. The pass-list was given in the JOURNAL for the 9th ult.; and we take the present opportunity for recurring to the subject, to signalize the pleasure with which we noticed the appearance of several well-known names in this honourable company. This is the best possible indication that these examinations are attracting the right class of candidates—young men who are following their fathers and friends in the gas engineering profession. It is no less complimentary to the Institute and their Examiner in "Gas Manufacture"—Mr. Charles Hunt—that success in these examinations has come at last to be regarded as a valuable aid to progress in professional life. We have seen for years past that this must be so, if the high standard of recent papers was kept up. Broadly speaking, the value of any examination increases with the difficulty of passing it; and we must heartily congratulate Mr. Hunt upon the systematic way in which he has framed his questions year after year so as to excite the interest of those who might naturally be supposed to desire some reliable test of their own acquirements. Moreover, the fact that more than one recent appointment has gone to graduates of the City and Guilds of London Institute may be trusted to give just the additional value to a pass-certificate that is needed to gild the silver medal, and convert the mere money prize into a token of higher reward to come. We cordially congratulate all these deserving young gentlemen, from Mr. Arthur Valon, who takes the Salters' Company's Prize and the Silver Medal of the Institute, as being first in the First Class of the Honours Grade, down to the "wooden spoon," whoever he may be; and we trust that these successful students may one and all develop into able, reliable men, and such as will worthily carry on the traditions of a calling which is not less honourable than any other occupation of our times. The gas engineering of the future will be no child's play, but a work calling for the highest devotion, and the keenest ability, and the most consummate tact in those to whom it is confided. Let who will prophesy the contrary, gas will be made during the lifetime of more than one generation yet unborn; and it is one of the most pressing duties upon those who actually live by the gas industry, and expect their children to do the same, to see that there shall be no lack of capable hands to take charge of this great industry when the present race of administrators relinquish the command.

With regard to this year's papers, it may be said generally that the questions go right to the heart of their subjects. The Ordinary Grade paper is a distinct advance upon all that have preceded it—not so much in intrinsic difficulty, as in hopelessness for all candidates who might have prepared themselves by the book instead of in the works. One or two of the questions might perhaps have been worded a little more clearly, so as to prevent risk of misapprehension: but there is nothing to complain of in the paper as a whole. As to the Honours Grade paper, it can only be described as "steep." We fancy we have on a previous occasion remarked the same tendency in the Examiner with regard to this paper. Only one or two of the questions can be described as answerable in a few lines of manuscript. Several of them entail a good deal of work, which it must have taxed the candidates to get through in the allotted time. In framing this paper, the Examiner has evidently tried his best to steer clear of matters of opinion; but it is hardly possible to do so, and still question candidates respecting points of contemporary practice. For example, it is all very well to ask an ingenious youth what he thinks of the "two distinctive "methods of heating retorts." The question is quite proper and reasonable; but, supposing the lad to come from a works where his chief has not taken the trouble to tackle the problem practically, he must stand at a great disadvantage in comparison with one to whom carbonizing experiments are matters of every-day concern. Again, seeing that one of the foremost practical chemists of the day lately claimed to have something fresh to say about the cause of the luminosity of gas-flames, it would seem rather "rough" on a student to ask him for a conclusive statement on the same subject.

We do not desire, however, to be understood as passing any but the most appreciative opinion upon these two admirable papers, which are calculated to test the soundness and comprehensiveness of attainment of any well-trained student of gas manufacture. If we were going to compose an address to such learners, we should, in all probability, enlarge upon the subject of training in the profession, and lay stress upon the many essentials of the good gas engineer and manager which no paper examination can touch. In this occupation, however, far too

little heed has been given in the past to what may be called the regular order of student's work, such as these examinations refer to; and other considerations have weighed too exclusively with both gas managers and their employers. We have had too much of the "practical man"—meaning, as a rule, the man who can handle a shovel better than the drawing-pencil or the pen, and (greatest recommendation of all) is at the same time a man who can be had "cheap," because he has none of the tastes and instincts of an educated gentleman. It would be well if it could be said with perfect truth that the terrible dearness of such men in the end, when employed out of their proper sphere, has become duly appreciated by all orders of gas-works proprietors and administrators; but the work of education must go on at all hazards. The best way to ensure the employment of good men in any industry is to provide plenty of them. It is hard for those who fail to place themselves; but what is to be done? It is better to have competition among the best, than rivalry among the worst; and so we wish well to the efforts of the City and Guilds of London Institute to raise the standard of efficiency for the recruits of the gas industry.

### Anthracene.

THE usual reports as to the working of suburban and provincial gas undertakings—some for six months, some for the whole year—are now appearing in the JOURNAL; and there is not much to be said here respecting them beyond noting that in all the same tale is told of prosperous and increasing business so far as gas is concerned, but of serious depreciation in the value of residuals. The total amount of revenue lost during the past year alone to the gas undertakings of the country through the latter influence is simply enormous. Shareholders, ratepayers, and consumers have all suffered from it in their degree; and in many cases reserve funds have been seriously depleted in consequence of the determination of the responsible heads of the undertakings to treat the depression as temporary. In these circumstances, it is but natural that men should put their heads together with a view to ascertain the cause, or causes, of the existing state of things, and to remedy the evil if possible. Foremost in this necessary consultation is Mr. George Livesey, to whom the key of the problem is tar; and when he says tar, he means anthracene. It is Mr. Livesey's idea that if makers of anthracene act with but so much of the "wisdom of the "serpent" as is permissible in business they will get their own price for this very unique product. On the other hand, if they give it away, nobody will thank them. This time there is no suggestion of burning tar to prevent the overstocking of the market, because, we suppose, it is not considered that the market is over-supplied; and also because matters could only be made worse by increasing the stocks of coke. Mr. Livesey is not alone in his enterprise, for we publish to-day some further contributions towards the elucidation of the subject. One correspondent ascribes all the mischief to the United States tariff; while the other has something pointed to say about the practices of The Gaslight and Coke Company. It may be fully expected that Colonel Makins will not forget Mr. Smit when next he has occasion to apologize for the Horseferry Road Administration. It is quite reasonable to suppose that M'Kinleyism may have had some of the effect attributed to it; and we are the more disposed to give due weight to the suggestion of Mr. Smit, because we have never been able to accept the opinion that bad commercial management by the Chartered Company could create the whole of the trouble from which this and all other gas undertakings are suffering. All the same, it is a fair question whether the very extraordinary arrangements of the Chartered Company do not, as a fact, aggravate whatever general causes may be in operation to depress the value of coal-tar products. It is not to be expected that people engaged in the coal trade will come forward in public to discuss, over their own names, questions which affect the very foundations of their business. We are able to state, however, that this tar problem, as it is being put in our columns, is attracting the closest attention of representatives of the gas and coal-tar industries of both hemispheres. And it is impossible, however much one might desire it, to dissociate its solution from considerations of Chartered policy. The output of this Company is so immense, that, if they stand aloof from other producers, the counsels of the latter cannot have any effect upon the market. Thanks to Sir Frederick Mappin, the sections of the community which are interested in these matters know how the Chartered residuals are sold. The ordinary Chartered shareholder who goes to the half-yearly meetings at the Horseferry Road betrays as much power of appreciating the conditions of the trade in gas-works residuals as a fat sheep does of the way of the market where he is put up to auction. Is there nobody to take the part of the Chartered Administration outside the "coward's castle" of the directorial chair? If there is, let him be heard now.

### British Gas Oils.

WHAT is to be the future of the British paraffin industry? Will it be any longer possible for the distillation of British oil shales to be carried on at a reasonable profit in face of the competition of natural oils from all parts of the globe? We believe that all that skill and perseverance can do to protect the native mineral-oil industry from an apparently impending fate will be done; but what will be the result? We do not pretend to such an acquaintance with the lamp-oil trade as would warrant our expressing an opinion upon its prospects; but there is at least one point where the gas industry makes contact with the industry of shale distillation, upon which we may offer some observations. This is the growing use of liquid hydrocarbons in carburetting gas. Every year sees British gas undertakings spending more money upon fluid carburetting materials. Some of it goes to America for light naphthas; the rest to Russia for oils to be used in water-gas producers. Now, it is only reasonable to inquire whether this money could not be spent at home. A considerable quantity of Scotch oil has been used in the manufacture of Pintsch gas for lighting railway carriages; but up to the present time, unless we are misinformed, hardly any of the same product has found a market amongst British gas manufacturers, to whose needs those of the Pintsch gas makers are but a trifle. The reason for this is doubtless a question of price. Surely, however, the last word has not been said upon this subject. It should not be impossible for distillers of shale and manufacturers of gas to come together, and arrive at a mutual understanding of the description of fluid hydrocarbon that is needed in gas-works, and the price at which it can be supplied. There is in different parts of the country any quantity of shale, the industrial value of which has hitherto been held to depend upon its suitability for making burning oil and paraffin candles. Is it not possible that the growing demand for gas oil may open up a fresh prospect for these comparatively valueless deposits? The question may be an ignorant one; but it is put in good faith, and may elicit an instructive response. Oil shales are useless for gas making as they are; but how much requires to be done to make them useful in this regard is a pertinent inquiry that seems to call for an authoritative reply.

### Marsh Gas and Coal Gas.

THE desirability of precision in the use of scientific terms, or in what the lawyers call "the language of art," was illustrated last week in some of the newspaper reports of the terrible explosion at the Tondu Colliery. This pit, as our readers are aware, produces steam coal, being one of the North's Navigation Collieries; and the gas industry consequently has nothing directly to do with it. Yet we were startled to read, in some accounts of the catastrophe which has so recently drawn the sympathies of all England to South Wales, that the disaster in question was due to an escape and subsequent explosion of "coal gas." In one sense, of course, this was so, inasmuch as the gas that came from the coal worked at Tondu was a kind of coal gas, just as the vapour that rises from water is water vapour. But it is hardly necessary to remark that coal gas is a term of art, applied exclusively to the gaseous product of the distillation of coal in closed retorts; and it is confusing when a careless writer employs it in a different sense. Unfortunately, mistakes of this kind have a remarkable power of sticking in the public mind; and it is therefore quite likely that there are many good people up and down the country who are by this time firmly possessed of the notion that it was the same sort of gas which they use for illuminating purposes that killed the hecatomb of industrial martyrs in South Wales. And indeed it sounds much less rational to explain this explosion by referring it to "marsh gas" than to "coal gas."

What, the newspaper reader may naturally ask, has marsh gas to do with a coal mine some hundreds of feet deep? The old miners' term "fire-damp" is much more expressive; and their "choke-damp" is conclusive—regard being had, of course, to the fact that the word "damp" in this connection does not mean moisture, as in common parlance, but is derived from the same root as the German *dampf*, and signifies any kind of vapour or gas emanation. The natural philosophers of the last century used the word "spirit" for the same thing; but this term did not hold good for long, as there was another, and, on the whole, a better use for it. Marsh gas has never seemed to us a sufficiently wide name for the light carburetted hydrogen to which the text-books have assigned it. It conjures up a too-particular vision of the origin of the compound. When no such gas was produced as the result of a manufacturing process, and when old marshes were commoner features of the English landscape than they are now, the term was more excusable. In the experience of the majority of the present generation of inhabitants of these islands, the "will-o'-the-wisp," or marsh-fire, is something which may be occasionally read of, but is very seldom seen. Consequently, when a text-book tells a schoolboy that marsh gas is so called because it is the gaseous exhalation of swamps, he is obliged to take the explanation upon trust. It does not appeal to him with the force that it would have possessed for a country-bred ancestor. We cannot see any way out of the difficulty, however, and can only hope that the newspapers will be a little more careful in future, and not ascribe to "coal gas" mine explosions which do not even arise out of working gas coal.

### The Trades Union Congress.

To-day the twenty-fifth congress of delegates of Trades Unions and Trades Councils opens in Glasgow; and, by preliminary account, it threatens to be "the largest ever "held." If it could be depended upon that in this modern instance the old saying about wisdom being found in a multitude of counsellors would be again justified, this statement would be reassuring; but experience of this particular kind of assembly does not warrant any such expectation. Upwards of 600 delegates are reported to have applied for credential forms, and more are expected. Mr. John Wilson, M.P., the Chairman of the Parliamentary Committee, will formally take the chair at the opening of the congress; but the Chairman-Elect is Mr. John Hodge, whose position is that of Secretary of the Amalgamated Steel Smelters and Chairman of the Glasgow Trades Council. Mr. Hodge is well spoken of as a good representative of the best school of Trade Union leaders; and it will be instructive to watch how he will fare at the hands of the Socialistic rabble who, as aforetime, will constitute the noisiest, if not the largest, proportion of the congress. Responsible political leaders will probably give the congress a wide berth; but, on the other hand, Sir Charles Dilke and several notoriety-hunters of all sorts will be very much in evidence. This annual gathering of unionist labour leaders ought to be productive of more good than it actually is; but, unfortunately, while the most stable and solvent unions, which really deserve the name of institutions, pay the greater portion of the expenses, and lend to the meeting all the weight it possesses, the "representatives" of the multitudinous spawn of mushroom "Societies" identified by name with the roughest of rough trades, not one of which contributes more than a few shillings to the general treasury, usurp the direction of the whole affair by sheer weight of numbers, and turn the congress into a bear-garden. It is only too clear, moreover, that, while these delegates meet once a year and talk, their speeches and resolutions do not possess any real value as indications of those movements in the industrial world in which both workers and employers are most interested. Such actualities as Durham and Tyneside strikes, the split between the Keir-Hardie faction and the rest of the gang, the troubles in the Winsford district, and the cloud over the cotton industry—these are the developments of Labour politics that one would like to hear about in the gathering that is sometimes pretentiously called the Parliament of Labour. Notwithstanding all the machinery of delegations and Trades Councils, however, Labour still behaves, in masses, like a dumb animal that kicks, or jibs, or runs away without any articulate warning, and too often without valid excuse. Blunders like the Durham strike should be impossible if the self-styled leaders who will make such a clamour in Glasgow during the rest of this week possessed anything like the authority to which they pretend. While the leading principle of so many of these men is to take all the credit they can get from the success of a strike, whether or not they advised it from the first, while disclaiming all responsibility for every movement of the kind that goes wrong, it is impossible to hold them in respect. Reverting to an observation we made last week, we shall watch with curiosity to see whether one of the recognized authorities upon orthodox Political Economy will avail himself of the opportunity for preaching to the heretical crowd which will listen to so much rubbish before the week is out.

## WATER AND SANITARY AFFAIRS.

The Local Government Board have doubtless acted from a sense of duty, in representing to the Metropolitan Water Companies who take their supplies from the Thames and the Lea, the necessity, at the present time, of bestowing special care in order to secure efficient filtration. Nevertheless the Board are in the possession of evidence showing that the seven Companies referred to have carried the filtering process to a high degree of excellence. Dr. Frankland's last annual report speaks of the "great improvement which the Water Companies "have effected in filtration" since 1868. In his recent monthly reports, the same authority has shown the remarkable degree of purity given to the supply by the process of sand filtration as carried out by the Companies; the results being tested by Dr. Koch's bacteriological method. It is simply necessary for these results to be maintained; and it is to be observed that the Companies have achieved this success in the face of much discouragement originally offered to their efforts. Had they yielded to official objections, they would have ceased their efforts, and the supply would not be as it now is. *The Times* of Thursday last, in referring to the action of the Local Government Board, admits the importance of taking every precaution, but very properly says: "The official reports "seem to show that filtration has been enormously im-"proved of late years." The real danger lies in the cisterns of the consumers. A striking contrast is drawn between London and Paris, very much to the advantage of the former, in respect to the prevalence of zymotic disease. London is described as not only one of the healthiest cities in the world, but as exhibiting "a specially "small death-rate from the particular diseases the preva-"lence of which is associated with polluted water." Remarks like these in the columns of the leading journal may, it is hoped, serve to counteract the influence of those mischievous statements which are apt to appear elsewhere. Even *The Times* is not altogether innocent in this respect. It published a letter last week, in which an anonymous correspondent speaks of "sewage-contaminated water" as being "distributed by various Companies to the "inhabitants of London for drinking purposes." The writer shows his ignorance of the subject by asking "on "which of the various sanitary authorities the London "people are to depend for protection from impure water." We presume the author of the letter has no acquaintance with the analyses of Dr. Frankland, and the reports which proceed from the Registrar-General and the Local Government Board. It is to be regretted that this misleading letter appears with the title of "Cholera and London "Water," as if there was an intimate connection between the two. As a specimen of wrong-headed bungling on this subject, we may cite an account given in the *Globe* of what is called the "Pollution of the "Upper Thames." We are thus told of "the efforts of "the Thames Conservators to secure the diversion of "offensive matter from that part of the river whence the "great Metropolitan Companies obtain their supplies." If there were any necessity for such efforts, it would be satisfactory to learn that the Conservators are "meeting "with success;" but it is really ridiculous to find sundry localities named, such as Teddington, Kingston, and Surbiton, which are below the intakes of the Water Companies. The bacteriological test, as applied to the river at Hampton, is also decidedly misunderstood.

Unintentionally, *The Times* bears witness to the fallacy

of entrusting a great undertaking, like the water supply of the Metropolis, to a local authority constituted after the manner of the London County Council. This is not said in so many words, but the principle is sufficiently clear. The subject under discussion is "The Problem of the "Ports," as presented in a series of contributions from a correspondent. In a leading article it is remarked that "Municipalization of great industrial enterprises is a "fashionable craze of the day." To municipalize the docks of London is deemed altogether perilous, although some change is considered highly desirable. Municipal management, in such a matter, "would be based upon a "sublime disregard of the principles of sound business." All the best-managed ports in the kingdom, it is argued, "have been entrusted to a special authority constituted for "the purpose." Hence a "Thames Improvement Com-"mission" is proposed, as constituting a single harbour authority for the Port of London. No doubt the London County Council would be glad of the post, and will probably put in a plea for it. But why should the Council plead in vain? *The Times* contends that a harbour is a national affair. So it may be; but the nation is not going to take care of the Port of London, any more that it takes care of the Mersey, the Clyde, or the Tyne. Why a Harbour Trust should be more effective than a Town Council, is a problem not hard to solve. The Harbour Board has one duty to discharge, and is not subject to the changes incidental to a shifting and semi-political body like a local authority. The argument applies to London and its water supply. The latter is a huge business, affecting a population exceeding that of Scotland and Wales combined. Those who administer it must understand their work, and must be so permanently placed in their position as to learn by experience, besides realizing a responsibility for results. The several Boards of Directors connected with the London Water Companies possess these qualifications; and if ever their functions are handed over to another body, prudence will suggest a less mutable authority than that of the London County Council, while it may be doubted whether any change would be found to work satisfactorily.

**Death of Mr. E. Ryde.**—We regret to record the death last Thursday, at his residence, Poundfield House, Woking Village, Surrey, of Mr. Edward Ryde, the well-known Surveyor. The deceased gentleman was within a few days of completing his 70th year.

**South-West of England District Association of Gas Managers.**—The members of this Association will hold their half-yearly meeting at Bournemouth next Tuesday, under the presidency of Mr. D. Irving, of Bristol. By the kindness of the Directors of the Bournemouth Gas and Water Company, the business will be transacted at the gas-works, where luncheon will be provided; and afterwards the Company's Engineer (Mr. W. J. Fuller) will conduct the party round the works, which have been largely extended to meet the growing needs of the district they serve. According to the programme issued by the Honorary Secretary (Mr. Norton H. Humphrys, F.C.S., of Salisbury), the business will comprise the election of officers for the ensuing year; the consideration of a proposition by Mr. S. W. Durkin to change the date of the spring meeting from March to April; the presentation of the President's Inaugural Address, the delivery of which was deferred from the Bristol meeting, owing to the full *agenda* which came before the members on that occasion; and the discussion of the papers by Mr. Riley and Mr. Frank W. Clark—on railway train lighting and carburetting gas—for which there was then no time.

**An Improved Reservoir Indicator.**—When an attempt is made to indicate by a pressure-gauge the depth of water in a reservoir situated at an elevation above the place where the gauge is erected, it is difficult to read off small variations, since they usually form an insignificant proportion of the range of the instrument. A Nottingham firm of engineers have, according to *Engineering*, constructed a pressure-gauge in which the index does not begin to move until a certain determined pressure has been reached; leaving the entire scale available for indications of the excess. When applied to water-works, the scale begins with the minimum pressure in the main, and extends to the maximum. The mechanical arrangement comprises the use of two springs of flat steel coiled into spirals. These are both slightly dished towards the side on which the pressure is applied. One spring is designed to carry the uniform water pressure, and its flexure does not affect the index until this pressure has been exceeded. A boss in its centre then comes in contact with the end of a spindle connected with the multiplying gear, and sets the index in motion. Connected with this spindle is the second spring, which now comes into operation—the two springs moving together for the rest of the range.

# ESSAYS, COMMENTARIES, AND REVIEWS.

## GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 441.)

BUSINESS on the Stock Exchange is still in a very unsatisfactory condition. During the past week, several circumstances have occurred to further increase the stagnation. In the first place, the spread of the cholera has created alarm, which has extended to the United States, and caused a sharp decline in American Railway stocks—ranging from ¼ to 3½ in the leading stocks. In the next place, credit has had another shake through the stoppage of the London and General Bank, upon which followed the suspension of payments by the Liberator Building Society—an institution controlling some £3,500,000 of capital. These troubles were bad enough; but, in addition, came the announcement that the whole of the share capital, amounting to £40,000, of the Kent and Surrey Building Society was gone, and that the Secretary had disappeared. This has raised fears as to the stability of kindred institutions. Although the Stock Markets are not directly affected by the difficulties of building societies, yet the loss sustained by small depositors must react on public securities to some extent, by producing an uneasy feeling as to the position of firms, as well as of individuals, owing to the connection of one with the other. All these influences naturally operate against the Stock Markets; and people with money can scarcely be blamed for confining their attention strictly to the best investment securities. There is, consequently, little or no demand for money, and day-to-day advances are easily obtained at ½ per cent.; while three months' bills are weaker, if anything. At the settlement, brokers had no difficulty in renewing their fortnightly loans at 1½ per cent. Notwithstanding the unfavourable events above described, the Stock Markets, apart from American Rails, have stood wonderfully steady. Consols proved scarce at the settlement, and have advanced nearly ½ per cent. on the week; and Indian stocks are likewise better. As regards Gas stocks, a further improvement has taken place. Gaslight "A" was fairly active, being 217 and 219 up to Friday; but on Saturday 220 was paid—showing a rise of 1. The secured issues were likewise wanted; but the greatest advance was 4 in the "H" stock. South Metropolitan issues have been very quiet. They were declared *ex div.* on Wednesday; and the "B" stock recovered 4 on Saturday. Commercial consolidated stock, although without any official notice of business, is recorded 2 higher. The Suburban and Provincial issues have been very quiet; the only stock in which dealings were recorded being Crystal Palace 7 per cent., at 139. But some inquiry has prevailed for Continental, which has advanced 1; and business was also done in Continental Union at 222, and European at 19⅜. Other descriptions were quite featureless. As regards Water stocks, the only feature is the rise of 1 in Kent, and Southwark and Vauxhall 10 per cent., and 2 in Lambeth. Tarapaca shares have been in some request; but prices are unaltered at 10½ to 11¼.

The daily quotations were: The Gas Market was very quiet on Monday, and stocks remained unaltered; but Lambeth Water 10 per cent. rose 1. Tuesday was again quiet; the only changes recorded being a rise of 2 in Commercial Gas consolidated stock, and 2 in the new stock. The feature on Wednesday was the rise of 4 in Gaslight "K." On Thursday limited dealings were again recorded; but Gaslight "H" rose 1. Friday was also a very quiet day, without any alteration in quotations; but on Saturday there was an inquiry for Gaslight issues. The "A" stock rose 1; "C," "D," and "E" preference and "J" preference, 2; while Imperial Continental gained 1; and South Metropolitan "B," 4. Kent Water was in request at an improvement of 1; and Lambeth Water 10 per in cent. was also marked 1 higher.

## ELECTRIC LIGHTING MEMORANDA.

**The City of London Electric Lighting Company—The "Electrical Review" on the Murdoch Memorial Lecture—The Fuel of the Future—Electrical Nomenclature.**

THE second annual general meeting of the City of London Electric Lighting Company has been held—Sir David L. Salomons, Bart., in the chair. There is not much to be said respecting the experiences of this undertaking up to date. It is still in the capital-expending stage of existence, and consequently everything connected with the venture is presented in the rosiest colours. The best that can be placed upon record about the Company at the present time is that the Board have decided to issue £200,000 of 6 per cent. preference stock, which the proprietors are assured will eventually turn out to be a first-class property. Sir David Salomons is a sanguine Chairman. He thinks the ordinary shareholders will get a dividend within a twelvemonth; and he is also under the impression that office lighting, which is what the Company will mainly have to depend upon when they get to work, must be more profitable than the class of business enjoyed by the West-end companies. We should have regarded the two classes of business differently, seeing that the "load factor" must be extremely irregular

in the case of counting-house lighting, which is rarely used after 6 p.m. But time will show where the real advantage lies. The Chairman, being as yet young in the trade, sighs for plenty of good fogs and dark days in the coming winter, with a view to the discovery of what the City requires in the way of lighting. He describes fog as the great friend of the Company, and says that arrangements have been made for the establishment of a fog-warning system. The appearance of fog is to be telephoned to the Company's stations from various points of observation; and, if they can only get ten minutes' notice, the staff expect to be ready for any fog that can be manufactured in the Thames Valley. These be brave words; and they may be justified. But those who know what a three days' fog about Christmastide means in London, will conclude that it is rash for anybody to presume to call such a visitation a friendly one.

Our contemporary the *Electrical Review* has at length become aware of Professor Vivian B. Lewes's Murdoch Memorial Lecture to The Gas Institute, which it criticizes in a recent issue, and attempts (with indifferent success) to depreciate as an effort in consolation on behalf of the "monopolists." It is decidedly amusing, however, to note how the would-be contemner of Professor Lewes "wobbles" between his desire to jeer at the lecturer's figures, and his admitted respect for them. Professor Lewes gave, in the course of his lecture, a tabular statement, compiled, as he said, by a colleague at the Royal Naval College from his own experiences, of the comparative cost of different systems of domestic lighting. It is unnecessary to repeat these figures, which our contemporary had been better advised to have left alone if it could not have upset them. Instead of this, the *Electrical Review* observes that Professor Lewes "titillated the feelings of the assembled gas managers, directors, &c., with some very soothing statistics which were designed to show how vastly more expensive illumination is by electricity than by gas, light for light. We all know that, in the hands of skilful people, statistics can be made to prove anything; but we must never inquire too closely into the source of such obliging data, *although in this case we regret that we cannot discover any error.* We therefore print the statistics as he gave them; merely stating that the first and last of his figures *agree with what we have ourselves always stated.*" Was ever a weaker ending than this to the trite sneer about the untrustworthiness of figures? We are truly sorry to find our contemporary in this plight. Its fairness in admitting the costliness of electric lighting has often been acknowledged in these columns; and why it should with one breath "hint a fault and hesitate dislike" in Professor Lewes's case, while constrained in the next to admit his correctness, passes all reasonable surmise.

The *Electrical Review* has, however, been roundly abused by many touting electricians for telling the truth about the cost of electric lighting; and possibly its conductors are consequently disposed to compound for their admissions on this head by attacking gas on other grounds. For this or some other reason we find it denying to gas even the humble office of universal heating and cooking agent in that future when there is to be no artificial light but that which is electric. We did think that, by common consent of all the scientific prophets—or shall we call them tipsters?—gas was safe for this consolation prize. But no; the electricians want to be first, second, and third in this race. Our contemporary rejoices mildly, with an affectation of pleased surprise, over the spectacle of the "scientific men and experts"—apparently distinct orders—who are presumably "disinterested in either gas or electricity," yet are found "continually advocating the claims of the latter to popular favour." Is there anything so very wonderful is this? Must not your scientific man be scientific, if he dies for it? Electricity being the newest thing in lights and fuels, every gentleman who wishes to escape the risk of being regarded as an Old Fogey feels constrained to appear on good terms with it. This is a harmless pretension; and since it seems to give pleasure to the electricians, it were a pity to stop it.

There was a somewhat interesting, although apparently fruitless discussion, at the recent British Association meeting upon the nomenclature of certain electrical units. The various applications of electricity to which the world is now being treated are attended by the appearance of many phenomena, attesting the operation of the unknown form of energy, which, for the want of a better word, we may term "symptoms." A closed wire circuit, and the dynamo which keeps up the supply of electricity in the circuit, and many things lying within or near the circuit, manifest a multiplicity of symptoms indicative of the activity or whatever it is that is going on within and about them. It is the function of our professors of physics to bring these symptoms to book as fast as they are distinguished; and in order to do this, it is necessary to name them. Unhappily, the language of men does not contain any undistributed reserve of words which can be drawn upon for the nomenclature of newly-discovered things, whether the things happen to be mountains in Africa, strange worms in mud, or manifestations of what is called electricity. Consequently, terms have to be created to fit the new things; and when the nature of these is not fully understood, the most expressive word that can be applied to them remains, as Matthew Arnold would have said, language "thrown out" towards the Unknown. If the word happens to stick to the thing, people grow in time to talk about it as though it were the thing itself; which is the way to confusion. The electricians have great difficulty in regard to their nomenclature. This is hardly to be wondered at, since, to the initial difficulty of the unknowableness of the things sought to be named, they have added the further obstacle of conspicuous want of tact in their suggestions of words for them. For example, Dr. Lodge has proposed that the total induction of magnetic circuits should be called their "Mo." Dr. Hopkinson shied at the name, which has more the savour of Houndsditch about it than of magnetic induction. Several other debateable points of electrical nomenclature were discussed upon the same occasion; but no progress was made towards either common agreement or intelligibility. This is hardly to be wondered at, since the invention of new words is to the full as difficult as the invention of new sciences.

## A CRITICISM OF STREET LAMPS.

One day last week there appeared in the *Daily Telegraph* one of those rambling, sketchy leading articles for which this newspaper is notorious; the subject being either street lamp-posts or the history of gas lighting—it is impossible to say which, for the writer passes so easily from the particular to the general, and back again, that one cannot be certain as to what he is thinking of from one sentence to another. He starts with the statement that in the Illustrated Catalogue of the International Exhibition in Hyde Park in 1862 there are engravings of at least a hundred and fifty examples of lamps, chandeliers, &c.; and he characterizes the display as "a singularly diversified and beautiful one." It is then remarked that "the only omission of importance appeared to be a pattern for an improved street lamp-post. That want is still felt in the Metropolis of the world. . . From one end of London to the other the same form of street-lamp—clumsy, tasteless, and monotonous—is visible. . . London is surely quite ugly enough, without its being sought to perpetuate the ungainly posts surrounded (*sic*) by equally ungraceful lamps, the hideousness of which is still more strongly accentuated by the large number of artistically-designed and elaborately-worked private lamps which hang over the doors of so many shops and taverns in the main thoroughfares." The writer then proceeds to observe that ugly as the London street lamp is, its immediate precursor, the oil-lamp, which figures in engravings of street scenes of the "Tom and Jerry" period, was still uglier. After a synopsis of the life and achievements of Murdoch, with a passing reference to Lebon, which fill up the body of the article, the writer returns to the subject of lamps; and declares that, with the single exception of the splendid range of lamp-posts surrounding the Grand Opera, the public lamps of Paris are "as tasteless as those which deface the thoroughfares of London, and which swarm all over the Continent and the United States of America, to say nothing of the cities of our colonial dependencies." Thus the candid critic surveys, in fancy, all the works of men's hands in the shape of lamp-posts, and only finds one example that pleases him. He winds up by artlessly suggesting that "one thoroughly artistic model . . . . might serve as a pattern for gas-lamps and standards sufficient not only to illuminate, but also to be an ornament to the hundreds of miles of streets in the modern Babylon."

The foregoing is a fair example of the calm assumption, by the common "or street" newspaper scribe, of the right to criticize, denounce, and offer advice in regard to any and every matter under the sun to which his undoubtedly quick, if unmistakeably shallow, intelligence happens to be momentarily directed. It will not be a waste of time to discuss this subject of street lamps with a little more regard for the facts than the *Daily Telegraph* writer has displayed, in order that the modicum of reason which underlies the extracts we have given may be extricated from the accompanying rubbish. We are not concerned to claim that the ordinary street gas-lamp, together with its post, as seen in the greater part of London and other towns, is a handsome object; but we can at least give a reasonable account of how it came to be what it is.

The general adoption of gas for street lighting dates from about the end of the first and the beginning of the second quarter of the century; and it was therefore at this period that street lamp-posts and lanterns had to be procured in large numbers for all towns where the thoroughfares were too wide to be satisfactorily lighted by the simpler means of wall-brackets. Now, whatever other characteristics the era in question possessed, it cannot be said that a widespread feeling for art was one of them. In fact, it was the age of Churchwarden Gothic, and was commemorated for London by the building of those interminable, plain, featureless streets and squares of the west central district which are the despair of the later generation. What could be expected of such an age, but the lamp-posts which it has left for us? For near a hundred years previously England had been isolated from the Continent, with all its founts of artistic teaching, and had also been starved by the expense of continuous wars. When the burst of prosperity which ensued with the long peace and the introduction of steam power set engineers, builders, and ironfounders to work upon the creation of a new England, there was no time to wait for the acquisition of the artistic sense. They did the best the

could; and it is almost matter for regret that their work was as strong and durable as it was ugly. Who is to bear the expense of breaking up all the lamp-posts that somebody pronounces to be inartistic? We can no more afford to do this than we can spare the money for laying Bloomsbury waste, in order that what the present generation is pleased to regard as its own better taste may have a free range for its fancy. A time will come, however, when even Bloomsbury will have to be rebuilt; and it will then be seen whether architects of the future will be able to grapple with the problem of endowing with pleasant variety and brightness of aspect the long perspectives which now characterize West Central and North-Western London.

It may be remarked, however, that even if the conventional pattern for street lamps and posts was introduced in the time of the Regency, there has surely been plenty of opportunity since for correcting whatever fundamental mistakes the original designers of these articles made, and for improving the models of both lanterns and supports. To this we reply with a free admission that the opportunity for improvement in this respect has existed, and does exist, and—notwithstanding newspaper scribblings to the contrary—that it is by no means neglected. When the *Daily Telegraph* writer presumed to condemn the London lamp-post as "the most hideous object ever seen in the capital of the Empire," it is only charitable to suppose that he had never made use of his eyes outside his native Clapham or Bloomsbury, where the serviceable, but homely, Georgian lamp-posts keep company with the workhouse-like façades of equal date. Otherwise he could hardly have failed to notice that, while London street-lamps and posts necessarily conform to one type, their variety of design is very marked. The lanterns are globular, conical, pyramidal—of all sorts of shapes deemed to be suitable for the object of protecting and exhibiting the light of the gas-flame; while the posts are lofty, as at street crossings; short, as on bridge parapets; heavily ornate, as at Charing Cross; elegant, as on the Victoria Embankment; neat, as in the newer City thoroughfares; plain, as in suburban roads. We do not say that any of these patterns of lamps and posts are perfect; but it is crass ignorance or shameful carelessness to put them down as all alike in hideousness, or to aver that it is necessary to go to one particular locality in Paris in order to see a decent (or in this instance, as it happens, an indecent) lamp-column. This is a case, in short, for the application of Mr. W. S. Gilbert's bitter sarcasm upon "the idiot who praises . . . . all countries but his own." It is so easy to presume to cleverness by shutting one's eyes to what is before one's face, and rhapsodizing about something far away!

To return from the silly talk about street lamps to the design of the lamps and posts themselves, it must be conceded that the unintelligent designers of the early and still most common patterns brought a burden of reproach upon their followers from which all the skill and pains of the latter can hardly deliver them. It is by no means easy to design a satisfactory street lantern and support, as any one who jeers at the ordinary patterns would find on trying his hand at the task. As for the absurd suggestion that "one thoroughly artistic model" ought to serve for all the public lamps of London, the crude notion could not have occurred to anyone possessing the slightest inkling of the effect of the infinite multiplication of examples upon a design. A pattern of lantern that might look in keeping with the front of a theatre would be sadly out of place before a cathedral, to say no more upon this very obvious aspect of the subject; while it is only a corollary to this conclusion that the plainest, most unobtrusive lamp-post is most likely to escape from becoming an eyesore when encountered at every street corner, and at every fifty or sixty paces along the roadways of a town. The charm that attaches to the "unique" is altogether different from the recommendation of that which must enter into the affairs of our daily life; and whoever has not arrived at the perception of this elementary truth in design, is certainly not in a position to utter any criticism worth a moment's consideration.

If there is one appanage of our modern civilization which is more frequently the subject of particular study than another in these days, it is the street lamp-post. Gas engineers have had many a turn at it; and they are at last satisfied with something very simple and unobtrusive, provided it shows its light well, and does not cost much to keep in repair. After the gas engineer comes the city architect and surveyor, who frequently has ideas of his own respecting the character of lamp that accords best with his improved street frontages. During the last twenty years the number of new streets that have been made in place of old "slums" in this country alone must have a total length of hundreds of miles; and it is hardly too much to say that in every case the character of the new lamps and posts has received anxious consideration. If a studied plainness of construction has been decided upon for the majority of these appliances, we are not prepared to say that the decision is wrong, from the æsthetic point of view, or from any other. It is easy to fling about the words "hideous," "commonplace," and other such terms of reproach; but it is very difficult to determine beforehand what will please everybody, whether in a matter of lamp-posts or anything else. We incline, moreover, to the opinion that, in a general way, it is not desirable for the arrangements for artificial lighting to obtrude themselves upon the public by daylight; and after dark the most ornate lamp-post escapes unnoticed.

Electricians have recently taken the subject of lamp-posts in hand; and it remains to be seen what the universal geniuses of the newspaper press will find to say about their latest productions in this line which are now to be seen in use in more than one thoroughfare of the City of London. It is satisfactory to observe that the crudity of the early Brush lamps has been abandoned, and the approved electric arc lantern is nowise distinguishable from the modern street gas-lantern for high powers, being in the form of an inverted frustum of a cone, or of a polygonal pyramid, fixed upon a post 20 feet high. These lanterns are neat, and in every respect the least objectionable erections of the kind we have seen anywhere; but they are so palpably copies of the works of gas engineers, that it will be impossible to condemn the one without by implication depreciating the other. Time and again also the plea is raised for the lighting of thoroughfares by central lamps, instead of by lamps ranged along the side walks. In theory, the central disposition of the lamps is unquestionably to be preferred, when the vehicular traffic is held to be of more consideration than the pedestrian usage of the pavements. It should be as superior to kerbstone lighting, as this is to lighting from wall-brackets. The practical question of expediency, however, is not to be answered for every case from general considerations alone. Where there is no side walk, and where thoroughfares are narrow and tortuous, as they are in many picturesque old towns of England and the Continent, bracket lighting is the only possible method; and where the streets are of moderate width, and the side walks are much frequented, it would be a mistake to do away with kerb lights. For very wide avenues, where there is also much traffic, central lights are obviously desirable; but we are of opinion that these should, in the vast majority of cases, be additional to, rather than a substitute for, kerb lights. And when used at all, they should be powerful lamps, mounted on high posts, and utilized also to mark "refuges" for crossing the thoroughfare. The wholly unjustifiable method of lighting a thoroughfare is one which has been much fancied by some electricians of greater imagination than experience—that of small lights suspended over the middle of the roadway by lines crossing it from side to side. There is no conceivable advantage that can be ascribed to this arrangement of lights for a street to counterbalance its obvious drawback of interfering with the free headroom which is the inalienable right of users of the public highways. A light which shines directly in one's face is greatly inferior in usefulness to one that strikes across the field of vision from one side. Again, narrow thoroughfares do not need central lights; while for wider ones, lamp-posts are vastly less likely to give trouble than swinging ropes.

In bringing to a close this brief examination of the condition and circumstances of modern street-lighting arrangements, we desire to repeat the expression of opinion to which we have already given utterance—that, while it would be wrong to describe these arrangements, particularly in connection with gas lighting, as perfect, it is childish nonsense to describe them as undiversified relics of the dark ages of art and technology which ruled from the Peace of Amiens to the Great Exhibition.

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**The Late Mr. J. W. Grover.**—In the JOURNAL last week we briefly recorded the recent death of the above-named gentleman, whose name, as already mentioned, came somewhat prominently before our readers last year in connection with the protracted parliamentary inquiry on the Metropolitan Water Supply. Mr. Grover was only in his 57th year; but he had had varied experience as an engineer. During the last twenty years, however, he had been largely engaged in connection with waterworks, especially in chalk and limestone districts; besides carrying out minor works for mills and mansions. He also visited the West Indies to report on the surveys for an extensive water supply; and he had been employed on similar professional duties in Egypt, Austria, Denmark, Italy, and Switzerland. He had made himself familiar with the important subject of the present and future water supply of London; and therefore he was probably the most suitable engineer available when the associated Vestries of the Metropolis required advice thereon.

**Protracted Litigation as to a Pipe-Joint.**—Something like ten years ago, an action was brought by M. Somzée, the well-known Engineer of Brussels, against a M. Trifet, for making what was alleged to be an imitation of his patent pipe-joint. The services of experts were called in; and the report of these gentlemen has been submitted. But, as far as we can learn, the question remains in just as much doubt as ever. This looks like a needlessly protracted litigation over so small a matter as a pipe-joint; but it is claimed for M. Somzée's arrangement that it allows of a more effectual compression of the interposed elastic material than any other joint, and therefore has special value. It seems that M. Somzée made use of this joint while M. Trifet was in his service. The Court will now have to decide in view of this fact, and of the contradictory conclusions come to by the experts it selected to assist it; but it is regarded as tolerably certain that M. Somzée will object to any consideration being given to so indefinite a report as the one the consultants have sent in.

## NOTES.

### Mr. Bryan Donkin on Cylinder Condensation.

Mr. Bryan Donkin, jun., is still working out, at his factory in Bermondsey, those experiments in steam engineering which have brought his name so frequently before readers of the JOURNAL. Among the most interesting and valuable of these are the investigations into the subject of steam-engine cylinder condensation, in which the supplementary heat of gas has been found useful. Many attempts have been made to produce a steam-engine cylinder in which the phenomena of condensation and re-evaporation could be witnessed in action. Some time ago, Mr. Donkin endeavoured to overcome the difficulty of glass cylinders by fixing on an ordinary steam-engine cylinder a glass vessel in which the same steam that was being admitted to and discharged from the cylinder could be seen condensing and re-evaporating at different periods of the stroke. The results of this arrangement were not so instructive as was desirable, because of the difficulty of measuring the observed effects quantitatively. Mr. Donkin has accordingly endeavoured to overcome this objection by fitting up in his engine-house a glass observation cylinder, about 4 inches in diameter and 4 inches long. The top and bottom plates are of metal, and the joints are made steam-tight by means of india-rubber rings. Steam is admitted into the cylinder as the steam-engine cylinder takes it, and is allowed to exhaust, although there is no piston in the glass cylinder. A small surface condenser is attached to the arrangement, so that the glass cylinder can be worked either condensing or non-condensing, at pleasure. Steam is supplied by a small branch from the main steam-pipe, underneath the horizontal portion of which is a row of gas-jets, by lighting which the steam supplied to the glass cylinder can be superheated by about 30°. The pressure used can also be largely modified. A gas-flame with reflector are provided behind the glass cylinder, to render the internal actions visible; and provision is made for thermometrical observations and the measurement of the condensed water. The results of some observations made with Mr. Donkin's arrangement are recorded in the *Engineer*, which states that these are sufficient to dispel some of the usual conventional ideas respecting steam-cylinder economy. There is no accumulation of thin uniform films of moisture upon the cylinder walls. On the contrary, there is a good deal of violent action; and the interior surfaces are never entirely dry. Neither the presence nor absence of a vacuum, nor the previous superheating of the steam, greatly affect the phenomena. Mr. Donkin is working out the explanation of his results, which may shortly be published.

### The Preservation of Wire Ropes.

Now that the use of wire ropes in factories of all descriptions is so greatly extending that all practical questions regarding these ropes, and in particular that of their protection against corrosion and other injurious influences, are becoming of almost universal interest, Mr. Herbert Cheesman writes to the *Engineer* on this subject; remarking that the most serious corrosion in most instances occurs in the inside of the ropes, so that inspection is powerless to detect it, except for the exterior wires. Deleterious effects may be working their way inside the rope, while the coating of grease, &c., on the outside wires may be intact, and may make the rope appear perfectly sound. The centre or core of a wire rope is commonly composed of tarred hemp; and when the rope works in acid or salt atmospheres, this core is soon dissolved by the acid, and then acts as a sponge, holding the corrosive influences in close contact with the metal strands. All these evils are stated to be prevented in Cheesman's "A. C. L." rope, in which all the cores and wires are, in the process of manufacture, coated with a special composition which is claimed to be a preservative of iron and steel. This fills the interstices of the rope, and makes it impervious to acid, salt, or damp. Samples of this make of wire rope, immersed in saline, acid, and ammoniacal solutions for many weeks, are reported to have remained wholly unimpaired.

### An Electrical Fire-Pump.

A somewhat remarkable suggestion for the occasional utilization of electric lighting currents distributed by street mains from central stations is contained in the so-called electric fire-engine manufactured by Messrs. Siemens Brothers and Co., Limited. The carriage and frame of the engine are of the pattern adopted by the Metropolitan Fire Brigade, and made by Merryweathers. The usual steam-boiler and pumping-engine are, however, replaced by a Siemens electric motor, driving an "Oddie" pump, which, by the way, looks as if it might be used for exhausting gas. The idea is to fix iron pillars, similar to hydrants, at convenient positions in the streets, carrying two branch wires from the electric mains, which terminate in a concentric union, to which a flexible concentric cable can be attached. Successive lengths of this cable can be connected up if the engine is desired to work at some distance from the junction pillar; and the whole connection is made to look and handle as much as possible like an ordinary hose-pipe. Of course, any sort of rotary pump could be driven by the electro-motor; but the new "Oddie" pump has been selected probably because it works at a high velocity, and will stand a good deal of back-pressure. The electro-motor makes about 450 revolutions a minute, and the pump will deliver at a pressure of 75 tons per square inch.

## COMMUNICATED ARTICLE.

### GAS COMPANIES' ACCOUNTS.

By Norton H. Humphrys, Assoc.M.Inst.C.E., F.C.S.

The suggestion from Mr. William Livesey on this subject (*ante*, p. 254) is the natural result of a widespead desire for some criterion of comparison which, if not evident at sight on the inspection of the published accounts, can be readily calculated from them, with a reasonably small expenditure of time and labour. That this subject might be ventilated with advantage, I think few will deny; for the present available methods of effecting such comparisons are not only extremely tedious, but uncertain when completed. Having devoted some time to, and accumulated a great many figures connected with, this matter during the last twenty years, I should like to make a few remarks concerning it.

"A comparison" is a wide term. It may indicate a comparing of the accounts with those for the previous year, or with those for the last fifty years. The shareholder's first care, for instance, is to see whether the expenditure and income have improved in their ratio towards each other, or if any adverse circumstances have arisen to interfere with the prosperity of the concern. If he has a large holding, or happens (as one of the directors) to be entrusted with the representation of the interests, to some extent, of his fellow-shareholders, he may wish to go more deeply into matters. If variations have occurred, he will want to find out how far they are due to unavoidable circumstances—fortunate or unfortunate, as the case may be; or whether they are the result of administrative or of technical skill, or of the absence, to a greater or less degree, of these desirable adjuncts. Or he may desire to take a larger view, and bring the results to comparison with those obtained in neighbouring towns, or in other undertakings of similar size. A consumer of gas, looking at the accounts as a consumer, would simply require to find out that the expenditure was not excessive, and that his interests, as represented by the limitations of rates of dividend, &c., were duly respected. The manager or secretary of a gas company, approaching the matter as one coming within the range of his professional *curriculum*, would desire to investigate the accounts as fully as the time at his disposal would admit. In each case, a broad summary such as that indicated by Mr. Livesey would be a *desideratum*, in the first place as showing the necessity, or otherwise, for further and more elaborate investigation.

Mr. Livesey bases his calculations upon the quantity of gas sold, as shown in the accounts. As to the correctness of this basis, there is scarcely room for doubt. It is, in fact, the "accounted-for" gas. On this point a strange anomaly prevails in practice. The term "accounted-for" gas is usually applied to include that used on the works as well as that sold. But the gas used is *not* accounted for—*i.e.*, is not shown in the financial accounts. And thus, in figuring on the actual receipts, it reduces the apparent average receipts per 1000 cubic feet of gas to the extent of perhaps 2 to 4 per cent. In dealing with the quantity of gas sold, again, there is the item of public lighting—a charge which in many cases includes other items besides that of gas supplied, such as the cost of lighting, extinguishing, cleaning, and repairing the lamps. If the local authorities undertake this, leaving the company to supply the gas only, then we have a correct return in the item of gas sold. But practice varies widely in this respect; some companies doing the lighting and extinguishing only. For purposes of comparison, this item may be reduced by deducting the cost of lighting, cleaning, and repairing public lamps, as shown on the opposite side of the accounts. The average meter system is generally adopted, except in the case of small undertakings; and here the consumption can be gauged with tolerable accuracy, by using approved makes of lamp governors. Yet there are cases where the actual consumption for public lighting is not accurately ascertained, because a certain amount is thrown in gratis. It may be that half-a-dozen ordinary lamps, at corners or in other prominent places, are replaced by high-power lamps without extra charge; or that a town clock, or the front of the municipal buildings, is lighted without charge. As a usual rule, no special care is taken to measure the gas supplied gratis; and if it appears in the accounts at all, it is only as a rough estimate. Sometimes discounts are allowed for prompt payment, or for day consumption, or to large consumers; and these discounts, instead of being divided over the several items of income to which they belong, are lumped into the general item of discounts, allowances, and bad debts.

In order to arrive at a fair basis for comparison, then, we must define first, the meaning and ways of arriving at the quantity of gas accounted for; and, secondly, the actual receipts for gas only. As regards the first, it is obvious that if the average receipts for gas are to afford a fair index of actual fact, the gas used on the works or given away must either be omitted, as being unaccounted-for gas, or if it is to be included, it must appear in the revenue account as accounted-for gas, preferably as a separate item. As to the question of actual receipts, expenses of lighting and repairing, &c., the public lamps, and all other items that do not represent gas sold, must be deducted; as should also the discounts that are allowed, if any. *Bonâ fide* allowances of an exceptional character, and bad debts, may

airly count as a trade expense, and figure on the other side. The gas used or given away, if included in the total gas accounted for, should also be reckoned as gas sold, and may be represented on the opposite side as part of the incidental expenses. With these precautions, the item of gas sold may be set on a fairly level basis for comparison with other undertakings; but, under existing practice, there is no item on the statement of account that is more influenced by diversity of procedure in making up. It should be mentioned that, in many cases, the items just instanced do not represent a large proportion of the whole; and, if an approximate comparison only is desired, they may be neglected. The gas used and given away will range from 2 to 5 per cent. of the whole; the charges in connection with public lighting will be somewhat less; and the magnitude of the discounts may be judged from that of the item of discounts, allowances, and bad debts as it appears in the accounts.

With regard to the "products," this item should represent the net receipts, after deducting carriage or cartage, cost of loading, and discounts other than bad debts or *bonâ fide* allowances of an extraordinary character. Where sulphate and other residuals are worked up on the premises, the net profit remaining after paying all expenses for labour or necessary materials, repairs of apparatus, &c., should be given. In most cases, the sense of the Act of Parliament in regarding each item of the accounts as a separate venture—having a distinct ledger account to which every item, either of expenditure or income, is carried—is pretty clearly carried out in regard to the products. If any error is made, it runs in the direction just noticed in the case of public lighting—viz., leaving out proper expenses which should be deducted, instead of appearing in general terms, such as wages, &c., on the opposite side.

Proceeding to the question of meter-rents, &c., for the purposes of arriving at the cost per 1000 cubic feet of gas accounted for, these should be reduced as low as possible by the deduction of the cost of repair and renewal of meters and stoves. These items cannot fairly figure as a part of the cost of producing gas, so long as a charge is made that is sufficient to cover them. Where the consumers are so liberally treated that the amount received as rents is not sufficient to cover these expenses, then the deficit is a *bonâ fide* charge against the working expenses. Extraordinary items such as profit from gas-fittings, interest, rent of land, &c., should appear as separate items, so as to avoid creating any misapprehension.

The expenses include wages paid, materials purchased, and establishment charges. The wages and materials include requirements for the working operations of manufacture, purification, and distribution, and also those for the repair, renewal, and maintenance of the plant. The third item comprises salaries, fees, rates and taxes, rents, law expenses, allowances and losses, and similar charges. I cannot agree with Mr. Livesey that the division of these into the items of "manufacture," "distribution," and "management" answers no useful purpose, or that it is not possible to arrange them with precision. The middle item of distribution may not be of much importance by itself; but I take it that the object in view, when this arrangement was framed, was to render more distinct the other two. The costs embodied under the head of distribution charges are to a great extent influenced by local circumstances, such as the nature of the soil, the neighbourhood or otherwise of mining operations, and the class of customers supplied. The fusion of all the items, with the exception of coal, under one heading, certainly does away with any errors due to management expenses being allotted to manufacture or distribution, or *vice versâ;* but it does not meet the cases already mentioned when considering the receipts. Indeed, it tends to cover up errors of that kind; because, as the accounts stand at present, it is possible to draw tolerably shrewd conclusions from the various items. The great object of analyzing the expenses is to define between items such as those of rates and taxes, which are beyond the control of the management, and those that may be influenced by skill and improvements in apparatus or working. To a considerable extent the whole of the expenses are beyond human control. The prices of coal, lime, iron, fire-goods, &c., and the rates of wages payable, are all matters of local circumstances, especially when comparing with other undertakings at a distance. But for comparison with the result of previous years' working, or with neighbouring gas undertakings, I think that at least four items are necessary—viz., "materials for consumption," "wages," "repairs and renewals," and "management." It is difficult to see how any confusion or misallocation could arise in the preparation of these. If a large portion of the repairs is carried out by the permanent staff of the Company, as indeed is always the case in a well-managed undertaking, the wages paid in connection therewith would, of course, go to "repairs;" the item of wages being considered to include only actual payments for carbonizing, purifying, distribution, and the daily operations in general.

I do not overlook the fact that much of the foregoing is merely a matter of opinion, based upon the particular lines of experience in which the writer's lot has happened to fall; and therefore I welcome the suggestion made by your correspondent "Figures" that the matter should be well discussed, with a view of arriving at some standard method of preparing gas companies' accounts. It would be possible to compile a set of concise, but definite, instructions for this purpose. I append a form which has been found to answer well for comparative purposes. I have used it for several years; and it is based on the 1871 form of statutory account, corrected, if necessary, on the lines above indicated. But it must be remembered that a reliable comparison cannot be formed from figures only. The skill of the engineer or of the management cannot be determined from the accounts alone, without a knowledge of local circumstances, such as prevalent rates of coal, wages, &c.

THE ——— GAS COMPANY.

*Year ended June 30, 1892.*

| — | Per Ton of Coal Carbonized. | Per 1000 c. ft. of Gas Accounted for. |
|---|---|---|
| | s. d. | s. d. |
| INCOME— | | |
| Gas | 40 1·6 | 4 3·7 |
| Products | 5 4·1 | 0 6·8 |
| Meter and stove rents | 1 4·7 | 0 1·9 |
| Sundries | 0 11·7 | 0 1·2 |
| | 47 10·1 | 5 1·6 |
| EXPENDITURE— | | |
| Coals | 16 8·8 | 1 9·5 |
| Purifying materials | 0 10·1 | 0 1·1 |
| Wages | 3 10·0 | 0 4·9 |
| Repairs | 4 2·0 | 0 5·5 |
| Management | 5 6·9 | 0 7·1 |
| Profit | 16 8·3 | 1 9·5 |
| | 47 10·1 | 5 1·6 |
| NET COST OF GAS | 25 9·7 | 2 9·3 |

**Mr. T. H. White** (son of Mr. Charles White, the Manager of the Blaenavon Gas and Water Works) has been appointed Manager of the Cwmbran and Pontnewydd Gas Company, Limited, in succession to Mr. T. Taylor, deceased.

**The Federated Institution of Mining Engineers.**—The annual general meeting of this Institution will take place to-morrow and the following day in North Staffordshire. Among the papers down for reading are: "The Mineral Oil Industry of Scotland," by Mr. R. T. Moore; "The Coal-Fields South of Sydney, New South Wales," by Dr. J. R. M. Robertson; "On the Method of Opening Out and Working the Rarer Coals of North Staffordshire," by Mr. Ernest Craig. Excursions will be made to the Chatterley-Whitfield Collieries and the Sneyd Collieries, Burslem, to the Great Fenton Collieries and Iron-Works, and to the Midland Coal, Coke, and Iron Company's Collieries.

**Gas Lighting on Indian Railways.**—The first-class carriage of the Madras Railway sent to Bombay to be fitted up with the Pintsch gas-lighting apparatus, was returned to Madras in June. The carriage which was thus experimentally lighted had only one lamp in each compartment; but when the system is introduced, each compartment will be fitted up with two lamps. The reservoir under each carriage holds sufficient gas to burn for 36 hours continuously. In the experimental carriage, there are two reservoirs, one on either side, containing sufficient gas to burn for 72 hours, owing to the reservoirs having at present to be charged at Bombay. The lamps are fitted with an arrangement by which the guard can, after the passengers have retired for the night, reduce the flame to a glimmer.

**The Flow of Water in Pipes.**—In a "Note" on this subject in *Engineering*, it is pointed out that, although many formulæ have been devised by various engineers for expressing the relation between the velocity of flow in a pipe and the head required to produce it, all of them are unfortunately complicated, and cannot be used for mental calculation or in the making of rapid approximations. In the vast majority of cases, however, arising in practice, the velocity of flow lies between 2 and 4 feet per second, and is, on an average, 3 feet. The head required to maintain this latter velocity through a length of clean cast-iron pipe is then:

$$\text{Head in feet} = \frac{\text{Length of pipe in feet}}{25 \times \text{diameter of pipe in inches}}$$

and the discharge in cubic feet per minute is very nearly equal to the square of the diameter of the pipe in inches—the error being less than 2 per cent. in excess. Both these calculations are easily performed mentally. For a velocity of 1 foot per second less than 3 feet per second, the head must be reduced one-half; and by a proportionate amount for intermediate cases. For a velocity of 1 foot per second more than 3 feet per second, the head must be increased by 0·7 times that needed for a 3-feet velocity; and that required for intermediate cases can again be determined by adding a proportionate amount for that needed for the 1-foot increase. In this way the head necessary to maintain, through a clean cast-iron pipe, a velocity of not less than 2 feet per second, nor more than 4 feet per second, which are the limits usually adopted in practice, can be determined mentally with an accuracy sufficient for 99 per cent. of the cases that arise in an engineer's practice. Having the discharge at a velocity of 3 feet per second, it is easy to obtain the discharge at any other velocity.

# TECHNICAL RECORD.

## MANCHESTER DISTRICT INSTITUTION OF GAS ENGINEERS.

Last week we gave a brief account of the 91st quarterly meeting of this Institution, which was held on the 27th ult. at Rochdale. We now conclude the report with the record of the proceedings at the meeting, which was held at the Corporation Gas-Works. The PRESIDENT (Mr. Charles Armitage, F.C.S., Assoc.M.Inst.C.E., of Lancaster) occupied the chair. In addition to members of the Institution, there were present Dr. Thorne (London); Mr. W. S. Stormonth (Coleraine), President of the North of Ireland Association of Gas Managers; and Mr. Thomas Stenhouse, F.I.C., F.C.S., Borough Analyst of Rochdale. Letters of apology were received from a number of absent members.

### A WORD OF WELCOME.

Mr. T. BANBURY BALL, Gas Engineer and Manager of the Rochdale Corporation, gave the members of the Institution, on behalf of the Gas Committee, a very hearty welcome to Rochdale. He said whatever there might be of interest in the gas-works, he should be very glad to show them. He was sorry the Chairman of the Committee (Alderman W. J. Petrie) was not present; but he had received a note from that gentleman which admirably expressed the wishes of the Committee. It was as follows:—

*Grove House, Rochdale, Aug. 26, 1892.*

I cannot be with you and your friends at the works to-morrow morning. It would have been a very pleasing duty for me to have bid a hearty welcome to the members of your Association; but I must ask you to do it for me. It has been my privilege at different times to pay visits to many gas-works in various parts of the country; and I have found gas engineers as a body to be the most willing to impart information, and the most courteously generous of any people from whom I have had to beg knowledge to supply my own deficiencies. I am quite sure it is a good thing for the engineers themselves, as well as for the corporations they serve, that they do so efficiently exercise interchange of thought and experience in their calling. Pray lay open to your brethren everything connected with our works that can possibly be of interest to them. In the hope that you may have a very profitable and pleasing day together, I remain, yours very truly,

WM. J. PETRIE.

Mr. Ball concluded by personally endorsing the wish expressed by Alderman Petrie, that the meeting in Rochdale might be both profitable and pleasing.

### THE MINUTES.

The HONORARY SECRETARY (Mr. S. S. Mellor, of Northwich) read the minutes of the last meeting, which was held at Skipton in May; and they were adopted.

### NEW MEMBERS.

The following gentlemen were nominated for election as members of the Institution: Mr. G. E. Stevenson, of Manchester; Mr. J. L. Mitton, of Longwood; Mr. J. W. Pitts, of Gomersal; and Mr. A. F. Goodson, of Drighlington.

The PRESIDENT proposed that all these gentlemen should be elected.

Mr. T. DUXBURY (Darwen) seconded the motion; and it was agreed to.

### THE BEHAVIOUR OF OXYGEN WHEN AIR IS USED IN THE PURIFICATION OF COAL GAS.

Mr. T. STENHOUSE then read his paper on the above subject, which was given in last week's JOURNAL (p. 384).

At the close of the paper, several interesting experiments were performed by the author. They included passing a gentle stream of oxygen through wide glass tubes containing lime which had become partly fouled by the passage of gas containing 2 per cent. of free oxygen. In a few minutes the lime in the tubes became very hot, owing to the oxidation of some of the sulphides of lime. The strong liquor (18° Twaddel) from the bottom of the lime boxes was shown, and also a quantity of sulphur which the liquor yields on adding hydrochloric acid; the acid decomposing the polysulphides. The action of crude gas, containing both sulphuretted hydrogen and carbonic acid, on lime water was also shown.

The PRESIDENT having invited discussion,

Mr. ISAAC CARR (Widnes) remarked that the theories propounded in the paper met with general acceptance; and the reaction which had been described by Mr. Stenhouse no doubt took place. But the point in which he (Mr. Carr) was most interested was the cost of the oxygen per 1000 cubic feet. His own idea was that it was about 5s. If that was so, it meant £2 10s. per million cubic feet for oxygen alone; and in addition to this, there was the cost of the purifying material. In ordinary gas-works—his own, for instance—the total cost of purification did not exceed £1 per million cubic feet; and he believed it was not more than £1 10s. in the majority of cases. Before thinking of adopting this process, he should like to know whether he was right in these figures. If they were correct, the cost seemed almost prohibitive. Another material was being used for purification which had points of similarity to the process described. He referred to oxide of manganese, or "Weldon mud." A purifier charged with Weldon mud was put on, and a stream of air passed in along with the gas; and it was said that the material would absorb some 50 per cent. of sulphur without being removed from the purifier. So great was the affinity of manganese for air, that there was very little danger of air passing the purifier and reducing the illuminating power of the gas. This seemed very nice; but he feared that, as in the case of the oxygen process, the cost was prohibitory.

Mr. THOS. NEWBIGGING (Manchester) said the members had had a most interesting and suggestive paper; and he only regretted that they could not have had it in print a few days sooner, in order to have carefully perused it, and come to the meeting prepared to speak with some weight upon the subject. Several points were put by Mr. Stenhouse in a clearer light than they had hitherto been placed by anyone dealing with the question of air or oxygen purification. In listening to the paper, he had been struck by the fact that advances were made step by step; and one discovery led to another. In the earlier days of the use of air or oxygen in gas purification, it was thought that the oxgen acted only on the foul oxide contained in the purifier, and so prolonged the purifying process. Whether or not it was first used in London, he did not know; but he believed it was first employed in Lancashire with knowledge of what the effect was. Now they found that more complex chemical reactions occurred, and that, when air or oxygen was drawn or forced through the purifiers, the oxygen acted upon the sulphuretted hydrogen—liberating the hydrogen in the form of water, to be deposited or absorbed later on. This was a great step in advance. The paper did not deal at all with the original process. In fact, it dealt scarcely at all with the old idea of the use of air in purification, but almost entirely with the effects of air and oxygen, apart from the revivification of oxide of iron. He should have been glad if Mr. Stenhouse had given the cost of the oxygen, as suggested by Mr. Carr; but he (Mr. Newbigging) supposed they would have this later on in the discussion. It was a great advantage to have a good chemist at a gas-works; and, in his opinion, a chemist should be employed at all sufficiently large works—at all those where they could afford to pay him for his labour—not merely for testing whether the oxide was spent, and whether there was only a certain quantity of sulphur in the gas, but for the purpose of research. Such information as the members had received that day from Mr. Stenhouse was to be obtained by employing a chemist at a gas-works; and he was sure that greater progress would be made if his suggestion were adopted. He agreed with Mr. Stenhouse that, to obtain the best results, a large purifying area was necessary; for he did not share the opinion that, if the oxygen process was adopted, they could reduce the size of the purifiers. All chemical processes must be slow; and whether or not the oxygen process was good, they must have a large purifying area.

Dr. L. T. THORNE (London) said he had listened to the paper with much interest; and there were two or three points in it to which he should like to refer. When Mr. Stenhouse put down the reaction—

$$2SH_2 + O_2 = 2OH_2 + S_2,$$

that expressed roughly what might be called the net result; but, as the author had explained in his paper, what actually took place was not a simple reaction like that. They did not understand what reaction was taking place in the purifiers with the use of oxygen—whether pure or in the form of air. There was no doubt that the full action of the oxygen took place only after a certain amount of sulphides, polysulphides, or hydrosulphides of lime had been formed; and thus enabled it to react on the sulphur compounds and the carbon disulphide in the gas. It was really the decomposition of the first products of purification, and not the direct decomposition of the sulphuretted hydrogen, or, at all events, not its direct oxidation, except through the intermediation of the third substance—the lime or iron oxide. After studying the subject carefully for some years, he was inclined to believe that the reactions were a good deal more complicated than was at first anticipated; and that the products formed and again decomposed in the purifying boxes were many, and probably very complex. He was surprised to find Mr. Stenhouse saying that, where sufficient oxygen was continuously used, carbonic acid gas would decompose the lime in the used-up boxes, and liberate sulphuretted hydrogen. In experiments he had made himself, he had found the reverse to be the case. In these experiments, although crude gas containing carbonic acid was passed through the foul boxes, no increase of sulphuretted hydrogen was given off at the outlet of the purifiers. No doubt the process which was going on in the lime boxes was of a complicated character; and the temperature, the nature of the lime, the amount of moisture present, and the state of division of the lime, played a greater part than one would at first suppose. This was the only explanation he could find for the fact that they had different results in Rochdale from those obtained in Shrewsbury and in Ramsgate, and, he believed, in Dukinfield, though in the latter place oxide of iron in place of lime was employed. As to the need for ample purifying space, he agreed with Mr. Stenhouse and Mr. Newbigging up to a certain point; but he did not think an excessive space was advisable where oxygen was used for purification. In experiments which he had made, he found that, where the rate of the gas was increased, the purifying was actually more efficient, and was better than when the gas

travelled at a *very* slow rate. Purification had also, in some cases, been improved where a slightly smaller quantity than the theoretical amount of oxygen was employed. It seemed to him that, if they had too large an area, the more highly sulphided compounds were not formed, or were so rapidly decomposed again, that they were not able to play their full part in purification. These compounds, he believed, were those most easily acted upon by the oxygen, and were those from which the sulphur was deposited. This was a very curious point, and required more working out; but he believed it would be found that, although a fair purifying area was advisable, a large excess of it was detrimental rather than otherwise to the success of the process. This was specially noticeable at Shrewsbury. When the process was first adopted there, they had very large purifiers and a summer make of gas; and the purification was less satisfactory than when the production increased in the autumn and winter months. With regard to what Mr. Carr had said as to the use of Weldon mud, he (Dr. Thorne) had had very little opportunity of following the experiments made with this material. He did not know if he had quite understood what Mr. Carr had said as to the affinity for air of the manganese in the Weldon mud, and that affinity preventing deterioration of the quality of the gas. It was something new to him if Weldon mud would absorb nitrogen, which was the deteriorative portion of the air. If it would do this, Weldon mud had a large future before it; but at present he was rather sceptical on the matter. Mr. Stenhouse had stated that in the purified gas at Rochdale there had been no increase of illuminating power by the addition of a very small percentage of oxygen. This was a result at which he (Dr. Thorne) had been very much astonished; and at present he did not understand it. Certainly, in this case, with purified gas, the addition of a small quantity of oxygen did not increase the illuminating power; but, with regard to the oxygen process, the claim had not been that oxygen should be added to the purified gas, but to the crude gas before it passed through the purifiers. As he had previously said, he believed the action which went on in the purifiers was very much more complicated than was generally imagined; and it might be that the increase of illuminating power obtained in some cases was due to this action. It was quite possible to imagine that, in the presence of sulphur compounds, sulphuretted hydrogen, oxygen, and active agents like iron or lime, there might be a reaction taking place which would produce small quantities of carburetted hydrogen. It was very difficult to say; but he was convinced, from the experience at Shrewsbury, Ramsgate, and other places, that there was an increase in illuminating power if the oxygen was used before the purifiers. Whether or not this increase was owing to any action on the purified gas, which did not take place in Rochdale, was a moot question. It might, as he had suggested, be due to a process going on in the purifiers. The careful experiments of Mr. Stenhouse on purified gas certainly did not show any increase of illuminating power; but whether this was attributable to the composition of the coal used at Rochdale, or to any other of the causes he had suggested, he could not tell.

Mr. Harrison Veevers (Dukinfield) thought it might be useful if he gave something of his experience as a practical gas manager. He had had the oxygen process at work for two months; and though, of course, he could not yet give any figures as to the cost of the oxygen, or the economy resulting from the change, he might say generally that he was perfectly satisfied with the results. Upwards of seven weeks ago, he temporarily connected two purifiers, and filled them with oxide, part of which had been used before; and since then he had not had to change. He had passed 4¼ million cubic feet of gas through the purifiers, and still it was clear of sulphuretted hydrogen. The quantity of oxygen he employed was 1 per cent.; and it was introduced before the exhauster and the scrubbers. Whether or not the oxygen improved the illuminating power, he could not say; but the gas had in fact been of higher value since the adoption of the oxygen process. This might, however, be due to the fact that they had not had to raise the purifier lids so frequently as before. Removing the lids daily, or sometimes twice a day, meant not only great loss of gas, but the inclusion of a quantity of air which was perhaps great in proportion to the quantity of gas in stock, and thus deteriorated the quality. He hoped, at the next meeting of the Institution, to give the members a great deal of information on the working of the process at Dukinfield.

Mr. Carr, replying to Dr. Thorne, said he was fully aware that manganese had no affinity for nitrogen, and also that nitrogen reduced the illuminating power of gas. His point was this—that, in the use of air with ordinary oxide of iron, as the oxide had less affinity for air or oxygen than manganese possessed, there was an increased liability for air to escape from the purifiers, and reduce the illuminating power of the gas, than if manganese were employed. This was the advantage of using manganese instead of oxide.

Mr. T. Banbury Ball said he did not think Mr. Stenhouse intended in his paper to say anything about the oxygen process as a process. The idea was simply to give the members some of the results noticed at the Rochdale Gas-Works with the use of both oxygen and air; and the paper must be received in this light, and not with reference to the oxygen or any other process. He would emphasize what Mr. Newbigging had said about the advantage of having a good chemist at a gas-works. He (Mr. Ball) was under many obligations to his colleague, Mr. Stenhouse; and he was most happy to acknowledge them. In conducting these and other experiments, they frequently had to work together; and the assistance which Mr. Stenhouse rendered him was very helpful. Dr. Thorne had mentioned the increase in the quantity of sulphuretted hydrogen coming out of the foul boxes, as compared with the quantity at the inlet. There could be no doubt whatever about this. The fact was constantly coming under their notice; and it regulated, to a certain extent, the change in the boxes. In connection with these experiments, he was very much struck by the large percentage of free lime—quicklime—which was always present among the foul lime. Mr. Stenhouse had mentioned it in his paper as 15 per cent.; and he (Mr. Ball) was not sure that it was not in some cases as high as 20 per cent., notwithstanding the fact that they had these boxes working long after the lime was thoroughly foul, and even delivering more sulphuretted hydrogen at the outlet than was present at the inlet. This also happened, as had been mentioned by Mr. Stenhouse: After the lime had been taken out, watered, and put back again, the boxes would absorb sulphuretted hydrogen and carbonic acid for a short time, and the temperature of the gas passing through the boxes would go up from about 50° Fahr. at the inlet to 90° Fahr. at the outlet. This might account, to some extent, for the presence of sulphuretted hydrogen at the outlet of the second box. They had the lime in one of these boxes broken up and put back again; and while it cleared the gas at the outlet of the first box, at the outlet of the second they had 3 to 4 per cent. of sulphuretted hydrogen. He hoped the experiments would be continued; and perhaps, as the result, they might arrive at something which they did not at present anticipate. The paper before them was certainly novel in some respects; and there were some problems referred to in it which had not received the consideration they deserved—partly on account of the difficulty arising in connection with the chemical portion of them, and partly from the time they occupied in investigation. However, if the result of the experiments had been of interest to the members of the Institution, Mr. Stenhouse would, he was sure, be extremely pleased.

Mr. W. W. Hutchinson (Barnsley) said he should like to know if more than ordinary difficulty was experienced with regard to the pressure when employing the oxygen process. What was the variation in the pressure in the boxes between the use of the ordinary process and the oxygen or air process? Again, was the spent lime more difficult to get rid of than the ordinary gas lime? He should also like to know the proportion of lime used per million cubic feet, and whether more supervision was needed than was required under ordinary circumstances to keep the gas right.

Mr. Stenhouse, in reply, said it had given him pleasure to listen to the remarks of Mr. Newbigging and Mr. Ball. What Mr. Hutchinson had asked might be answered by Mr. Ball. When air was used in purifying, there was not much increase in pressure. But with 1 per cent. of fairly good oxygen, and a pretty large make of gas passing through the lime boxes, the pressure occasionally suddenly increased. With poorer oxygen and the gas passing more slowly, these sudden increases of pressure were not experienced. Mr. Newbigging asked about the lime. In a fouled box there was often 15 per cent. of lime unacted upon. This was because some of the lime became crusted over with the various sulphides, and the foul gas could not reach it. When the lime from such a box was broken up and exposed to the atmosphere, most of the fresh lime became free and active, and again capable of absorbing both sulphuretted hydrogen and carbonic acid when put back into the box. Mr. Veevers had large oxide purifiers, and in the summer time the oxide was easily revivified *in situ* by oxygen. These oxide boxes were not comparable to lime boxes. Possibly sulphur would be set free by oxygen in an oxide box; and this sulphur, while fresh, would absorb such compounds as bisulphide of carbon, and thereby reduce the total sulphur in the purified gas. Dr. Thorne referred to the lime boxes throwing off sulphuretted hydrogen. In his (Mr. Stenhouse's) experience, this had taken place over and over again. He had known one-fifth more sulphuretted hydrogen to leave a box than entered it; and their lime boxes were somewhat in that condition while he was speaking.

Mr. Duxbury proposed with great pleasure a vote of thanks to Mr. Stenhouse. The members had, he said, been looking forward for some time to the result of the experiments at Rochdale. One of the best things was a practical test; for they must all learn from actual experience. Mr. Ball was fortunate, as he admitted, in having a chemist on the works. Most managers had not time to go into these matters; and he hoped the time was not far distant when gas companies and corporations would see that it was to their interest to have a thoroughly practical and qualified man on the works to conduct experiments and make tests.

Mr. Veevers seconded the motion.

The President, in putting the resolution, remarked that Mr. Veevers had promised a paper on the same subject for the next meeting; so that it would come up again for discussion.

The motion was carried, and briefly acknowledged by Mr. Stenhouse.

After this the members visited the gas-works, and carried out the rest of the programme, as reported last week.

## SOCIÉTÉ TECHNIQUE DU GAZ EN FRANCE.

### The Papers Presented at the Annual Congress.

In a previous issue of the JOURNAL, we published a general report, translated from the *Journal des Usines à Gaz*, of the proceedings at the recent congress of the above Society at Tarbes. We are now able, from the same source, to give an epitome of the papers presented on the occasion.

A *mémoire* on the subject of "Gas as a Motive Power" was submitted by M. Chauveau in competition for one of the Society's prizes; but the author agreed to allow it to be regarded as an ordinary communication, and therefore open to discussion. He passed in review the various improvements which have been introduced in the construction and application of gas-engines; and the remarks to which the paper gave rise turned on the following points: First of all, have the improvements effected been in the right direction? As a general rule, attention has been fixed on utilizing to greater advantage the energy rendered available by the explosion of the gas, simplifying as much as possible the different parts of the mechanism, and producing strong motors. Has the price of gas any influence upon the development of gas-engines? According to the figures furnished from 18 gas-works in towns having upwards of 50,000, and even of 100,000 inhabitants, the consumption of gas for motive power is only a small percentage of the total, whatever may be the price of gas; and the maximum in France appears to be 7 per cent. Then as to the cost of the motor. Has that any influence? According to particulars furnished by M. Chauveau, there is no appreciable difference between the prices charged by the various makers. The gas-engine is dear—some people say very dear. But it must be borne in mind that it requires for its construction materials of superior quality, very careful manufacture, and prolonged trials for the regulation of the constituent parts. On the other hand, there is generally allowed an abatement to the extent of 15 per cent. of the price. From the consumer's point of view, the gas-engine is still a delicate machine, which cannot be entrusted to, or be repaired by, an ordinary workman; and this becomes an element of expense. Moreover, it consumes an expensive combustible. It possesses incontestable advantages, especially when small or intermittent power is needed. In order to ensure its introduction into workshops where power to the extent of a few horses is required, or to have it substituted for a steam-engine, united efforts and willing concessions, both on the part of the makers of motors and the sellers of gas, will be necessary. It will be with these engines probably as with improved lighting appliances, high-power burners, &c., the employment of which only becomes really general when gas companies decide to encourage, by all the means at their disposal, their adoption by consumers.

Of the papers read at the meeting, the first one noticed is by M. Kreglinger, on the subject of the handling of coal in gas-works. It dealt generally with the arrangements adopted in England and America, and notably those in use at one of the principal London works. The Committee comment but briefly on the paper; remarking that mechanical conveyors of coal are only suitable for very large works, although they are to be recommended, seeing that they reduce by 50 per cent. the cost of handling the raw material, if the author has been rightly informed.

The second paper consisted of some observations by M. Lauras on a new regenerator furnace in use at the Rouen Gas-Works. A description of the furnace was presented to the Society at their meeting in 1889; but it was then the only one of its kind. At the present time there are in existence five other double furnaces which have been successively put up at the above-named works; so that the working results of the whole—comprising 96 retorts—are now available. In this installation, the generators of the original Siemens furnaces have been retained. The author prefers the generators placed forward and against the furnaces. He employs for a double setting two generators and two grates, closed as tightly as possible by doors provided with a damper for regulating the entrance of the primary air. In this way it would be easy to keep the grates in good condition; and there would be less loss of carbonic oxide owing to clinkers. The draught of the furnace is so regulated as to ensure the carbonization in four hours of charges of 150 kilos. (330 lbs.) of coal per retort. In order to prolong the life of the retorts, their points of support have to be multiplied. This is effected by doubling the walls between the gas nostrils; thus constituting a succession of chambers, some with and others without nostrils, with no apparent inconvenience so far as the interior temperature of the retort is concerned. The object of the author was not primarily to effect economy of fuel, but to produce an appliance which, he says, is almost indestructible, and which, owing to its simplicity and solidity, offers safety and regularity in working. In the discussion upon the paper, the question raised was as to whether it was preferable to employ settings of eight or nine retorts. According to some speakers, the latter are difficult to work, first of all in respect of the charging of the top retorts, and next in regard to the regulation of the gaseous current in the upper parts of the setting; and the result has been their discontinuance in some works. Others, however, considered the setting of nine preferable, because it ensured a better utilization of the fuel without imposing heavier work upon the stokers. There is no reason for restricting the number of retorts when this is not necessitated by want of space. At Roubaix there has been erected, and put into use since November last, a setting of eleven retorts; and no difficulty has been experienced. Settings of nine are employed in Lyons, Toulouse, Marseilles, and Paris. Judging from experiments made with transformed settings, labour costs the same, while the expenditure for fuel is decreased by 1 per cent., by setting nine retorts where previously there were only eight. The objections raised to the larger number do not, therefore, seem to be well founded.

In a note on the condensation of ammonia, M. Frère described a simple apparatus with which he has been able to effect some noteworthy results. Starting with the two conditions laid down by M. Melon, in a communication presented to the Society in 1888, as being necessary to the proper condensation of ammonia—viz., to lower the temperature of the gas as much as possible at the moment of its entrance into the washer, and to bring it into contact with extensive surfaces kept constantly wet—M. Frère endeavoured to prove that the absorption of ammonia increases proportionately to the lowering of the temperature of the gas on passing into the washers, and that this lowering has a preponderating influence, without, however, any necessity for going below 12° C. (54° Fahr.), when the condensing appliances are proportionate to the production of gas. He worked with a Chevalet washer followed by a sheet-iron tower scrubber 5 ft. 6 in. in diameter and about 13 feet high, filled up to a height of 6 ft. 6 in. with pebbles about the size of a walnut, and above these a layer of wood shavings. In a series of experiments carried on in January last year, the following results were obtained:—

| Temperature of the Gas at the Inlet to the Chevalet Apparatus. | | Ammonia per 100 Cubic Feet at Outlet of Scrubber. |
|---|---|---|
| 9·0° C. | .. | 0·26 grains. |
| 9·5° | .. | 1·62 ,, |
| 9·5° | .. | 0·61 ,, |
| 10·5° | .. | 2·23 ,, |
| 11·5° | .. | 2·84 ,, |
| 14·0° | .. | 6·99 ,, |

The scrubber was supplied with clean water at the rate of 6½ to 11 gallons per ton of coal carbonized, according to the season. The results recorded in the paper show that, with simple and inexpensive appliances, it is possible to extract almost the whole of the ammonia contained in gas.

Various instruments and appliances used in connection with the manufacture and supply of gas were described at the meeting. Herr Lux brought forward his new pressure-gauge; and other pressure-registering instruments were introduced by M. Marchal. An apparatus for the production of carburetted water gas was described by M. Jouanne. It has been constructed for furnishing rich gas for lighting the halls of a casino, as well as gas of poor quality for the service of the engines employed in the electric lighting of the exterior of the building. In reference to this communication, the Committee of the Society expressed the opinion that carburetted water gas could not take the place of coal gas in tons of any importance, but must be regarded as an auxiliary, as was being done in London. They added that in France the necessity for this auxiliary did not yet appear to have made itself felt. M. Bachelay then described a standard constructed for a combined system of lighting—by gas and by electricity—at Toulon. A special feature was the arrangement for bringing down the electric lamp (placed at a height of about 30 feet from the soil) for the renewal of the carbons. The mechanism was somewhat complicated in appearance; but it was stated to have worked well for upwards of a year. Four standards, carrying, at a height of about 15 feet, two gas-lamps, each burning 15 cubic feet of gas per hour, and at a height of 30 feet an electric lamp of 15 ampères, were found to illuminate very well an open space having a superficial area of 14,500 square yards. A high-power burner was described by M. Granoux. Two types of the burner have been constructed—one giving, for a consumption of 6 cubic feet of gas, a light of 33 candles; the other, with a consumption of 10·5 cubic feet of gas, a light of 60 candles. M. Garnier furnished details of some automatic gas apparatus for use by hatters; M. André described a new form of tap; M. Delahaye brought forward the gas and electric light statistics published by the Massachusetts Board of Commissioners as an example of what might be done in France to satisfy those managers of gas undertakings who have expressed a desire to have particulars of these illuminants. Finally, M. Seguin gave a description of an ambulance station established at the gas-works at Le Mans.

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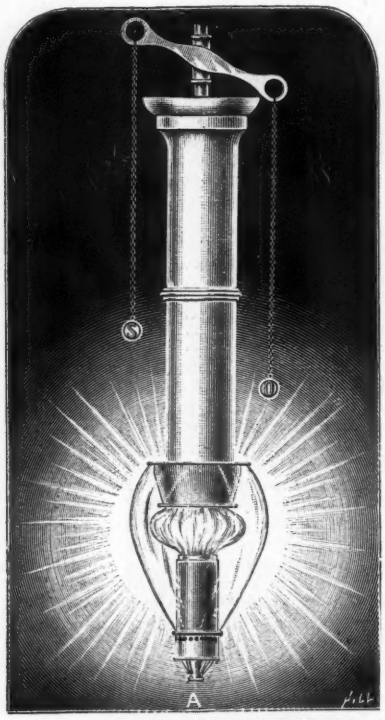
**Mr. Hislop's Remarks on Coal Analysis at the Meeting of the North British Association.**—Mr. G. R. Hislop, of Paisley, calls our attention to an error in the report of his remarks on Mr. M'Crae's paper on "Coal Analysis," at the recent meeting of the North British Association of Gas Managers, which appeared in the JOURNAL on the 9th ult. He is there made to say that 0·5 per cent. of water in coal would affect the results by something like 4 per cent.; whereas he says he stated that 1 per cent. of water would influence the result to this extent. As the first-named figure was taken by Mr. Humphrys in connection with some remarks contained in his article on "Coal Analysis" in last week's issue, it is necessary to put the matter right.

## THE "VERTMARCHE" RECUPERATIVE GAS-LAMP.

Recognizing the fact that the recuperative gas-lamp is the lamp of the day, Messrs. Henry Greene and Sons, of 153 and 155, Cannon Street, have just introduced an excellent new variety of the general type which they have registered under the name of the "Vertmarche"—the name being a play upon the French for the words composing the names of the joint inventors, Greene and Walker. We illustrated and briefly described the invention in our "Register of Patents" on Jan. 19 last; and one of the lamps was shown at Stirling on the occasion of the recent meeting of the North British Association of Gas Managers. The accompanying figure represents the plainest commercial form of the lamp, as now put upon the market. It will be seen from the illustration that the shape of the "Vertmarche" lamp is more elegant than that of the majority of similar articles, the dumpiness of the usual hemispherical glass being replaced by a graceful egg-shaped form—by no means an insignificant consideration where the lighting of a handsomely-proportioned interior is in question.




The construction of the working parts of the lamp gives a very energetic flame, of the shape of an extremely oblate spheroid, the larger diameter of which in the case of the most powerful lamps is as much as 7½ inches; thus rendering the light shadowless. The inventors have aimed at the production of a recuperative lamp which shall not be liable to foul or choke at the orifices of the burner, and shall be free from complications, and—last but not least—shall be sold at a comparatively low price. Their high initial cost has stood in the way of the popularization of every known respectable make of recuperative gas-lamp; and of some descriptions of such lamps that have been marked a little lower than others, it is enough to mention that the workmanship is not above reproach. It is claimed for the "Vertmarche" lamp that it is really cheap, in the true sense of the word, owing to the simplicity and strength of its construction, and the absence of steatite burner, porcelain funnel, and everything that tends to heighten the cost of the best of the older patterns of lamps. The next drawback to many kinds of recuperative lamps has been their liability to choke—necessitating periodical attention by skilled hands; which, apart from the expense of the process, rendered the lamps unavailable for use in localities where no such attention could be procured. To avoid this in the "Vertmarche" lamp, the region of greatest heat for the gas is not in the burner itself, but in the pipe which brings the gas to the point of combustion, and which is taken through the centre of the flame, where it gets more than red hot. It is averred that this roasting does not hurt the gas to any appreciable extent, while it causes the carbon that would otherwise be deposited in the burner to collect in a place whence it can be easily removed at any time without affecting the working arrangements of the lamp.

Another feature of the "Vertmarche" lamp is the provision which it contains for burning gas of any quality, and under any ordinary variations of pressure. This is effected by means of a simple but efficient regulator, in addition to the usual governor; the two combined serving as a complete guarantee against the lamp smoking or going wrong in consequence of accidental oscillations of pressure or illuminating power. It will thus be seen that the low price of the lamp in question has not been obtained by any sacrifice of efficiency, or by depriving it of any of the customary safeguards for permanent working.

These lamps are made in three standard sizes; the smallest consuming 15 cubic feet, the intermediate size 28 cubic feet, and the largest 42 cubic feet of gas per hour. There is a great demand for powerful lamps for public halls, &c., to compete, upon economical terms, with the electric arc light; and the "Vertmarche" lamps have been introduced in order to meet this demand, which they are calculated to do successfully, both in respect of first cost and running expense. It is evident that a light of 420-candle power for from 1d. to 1½d. per hour, according to the price of the gas used, is a competitor which the arc lamp cannot pretend to despise.

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**The Proposed Acquisition of the Todmorden Gas-Works by the Local Board.**—Last Friday week, a statutory meeting was held at Todmorden, to consider the advisability of authorizing the Local Board to apply to Parliament for an Act to enable them to purchase the gas undertakings. The Chairman of the Board (Mr. A. Crossley) presided, and moved a formal resolution, after which Mr. W. Jackson, the Chairman of the Gas Committee, said the works proposed to be purchased consisted of those of the Todmorden Gas Company, for which it had been agreed to give £76,862 10s., for Messrs. Fielden's works, £20,000, and for Messrs. Wilson Bros.' works, £6500—total £103,262 10s., which is equal to 13½ years' purchase. There was little or no opposition to the purchase; and the resolution was carried by a large majority, but a poll was demanded.

**Inclined Retorts at Middlesbrough.**—The inclined retort system has had a good start at the Middlesbrough Gas-Works; four through beds of six retorts (24 in. by 15 in. by 20 ft.), or 48 mouthpieces, having been set to work, all of which are doing well—the carbonizing costing only about half of the old rates. The Gas Committee are issuing schedules for the supply of retorts, fire-bricks, &c., for the extension of the system to five other beds; thus making 108 mouthpieces to complete the new house. The members of the Committee are to meet on an early date to inspect the working and heating, which is on the regenerative principle, according to the designs of the Corporation Gas Engineer (Mr. D. Terrace). This, we learn, is also proving satisfactory; there being good and regular heats throughout the settings. The make of gas per 20-feet retort is about 20,000 cubic feet per 24 hours. The amount of fuel used is reduced by 50 per cent., as compared with the old method.

**Exhibitions of Gas Appliances.**—On Tuesday, the 23rd ult., an exhibition of gas appliances was opened in the New Public Hall, Gravesend, by the Mayor (Mr. G. M. Arnold). It was held under the auspices of the Gravesend and Milton Gas Company; the whole of the arrangements being in the hands of their Engineer and Manager (Mr. J. Davis). The exhibits comprised a good collection of stoves supplied by the Davis Gas-Stove Company, Limited; prepayment meters, by Messrs. W. and B. Cowan; gas-fittings, shop reflecting lights, and Welsbach burners, by Messrs. D. Hulett and Co., Limited; the "Meteor" ventilating gas-lamp, by Messrs. H. Greene and Sons; "London" Argand burners and some beautifully decorated shades and screens, by Messrs. W. Sugg and Co., Limited; and a number of flat-flame and other regenerative burners, by Mr. F. Siemens. The adaptability of gas for motive power was shown by an "Otto" and a "Stockport" gas-engine. Lectures on cookery were delivered twice daily by Miss Cameron during the continuance of the exhibition, which closed on the 27th ult. On Monday last week, Messrs. Richmond and Co., opened an exhibition of gas appliances in the Town Hall, Gateshead. The feature of the display was the firm's "Model" ranges. Cookery lectures were given twice daily by Miss Owen.

**Fatal Accident to a Labourer at the Beckton Gas-Works.**—Last Tuesday, Mr. Wynne E. Baxter held an inquiry at the Poplar Town Hall, as to the death of Robert Toms, 55, a labourer, who was employed at the Beckton Gas-Works. Joseph Sharp, deputy-foreman of the yard labourers, stated that, at a quarter past six on the previous Thursday, he sent the deceased to one of the retort-houses to clean out the furnace after repairs. He had been doing this work for a month in the same house. About a quarter to eight, witness was sent for, and found the deceased lying beneath some trucks which had just been pushed up by the engine. He was dreadfully injured about the legs, and witness had them bound up, and the man sent on an ambulance to the hospital. Witness saw the deceased in the hospital, and asked him how he came to be where he was found. Deceased replied that he "thought the cokers had done work, and he went to sit down there." Witness said deceased had no business to be in the bay where the rails were; and he was surprised to find him lying there. Other evidence showed that there was only a space of about 19 inches between the trucks and the wall; and from the position in which the deceased was found, coupled with the fact that he was a very heavy man, it was assumed that he had been either sitting or lying down when he was caught by the trucks. The coke wheelers, having finished loading at that spot, had left, and turned the lights out; and the place was almost in darkness. The engine pushed the trucks, which stood a few yards apart, together, and then out at the other end. It was usual for the driver to whistle on entering the bay; and he did so twice on this occasion. At about the middle of the bay, he heard screams, and at once pulled up; and the deceased was then found lying beneath the wheels of a waggon. Two gas-jets were alight; and he was extricated. The witnesses agreed that it was an extraordinary position for a man to place himself in; but they were strongly of opinion that the man was not knocked down. Dr. R. H. Collins, House Surgeon of Poplar Hospital, stated that the deceased was admitted with both legs very badly crushed, and the left one had to be amputated. Death took place from shock and exhaustion 24 hours later. The jury returned a verdict of "Accidental death," and added that "greater precautions should be taken to prevent accidents by further warnings to the workpeople and better lighting arrangements."

# CORRESPONDENCE.

*[We are not responsible for opinions expressed by correspondents.]*

## Anthracene.

SIR,—In reply to the letter of Mr. George Livesey, in the last number of the JOURNAL, allow me to say that the very low prices of tar and tar products are the consequence of the high import duties on the latter and their derivatives, resulting from the M'Kinley tariff. I heard this some time ago from one of my friends; and this explanation has also been given to the conductors of gas-works on the Continent by two of the ablest and most reliable men engaged in the tar business, as well as by the Directors of the Society of Chemical Industry at Amsterdam (the only tar distillery in the whole of the Netherlands), who, as is well known, are always fully cognizant of what is for the general advantage not only of Dutch, but of other gas undertakings.

TH. SMIT.

*Amsterdam, Sept.* 1, 1892.

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SIR,—The tar trade is indebted to the Chairman of the South Metropolitan Gas Company for having at last taken up a question which has been exercising the minds of tar distillers for the past decade, and for lending his powerful support to the generally prevailing opinion that the cause of the low price of anthracene has nothing whatever to do with the state of trade at any time. Your own very lucid leader on the subject in the JOURNAL for the 23rd ult. goes far to substantiate this opinion. But it does not go quite far enough, for it leaves the true cause in doubt; and we all know that there can be no proper cure effected until the real cause of the disease is laid bare.

Now, it may be thought that the task in this case is easy enough if one will only take the trouble to study the history of the downfall of anthracene from its very beginning. Going back some eleven years, it would be found that the stock of The Gaslight and Coke Company had been allowed to accumulate to an unprecedentedly large extent, owing to consumers holding back in the hope of the Company getting frightened in the end into selling at much lower prices. In this expectation, consumers were, however, suddenly checked by a group of speculators who had formed themselves into a Syndicate, and succeeded, nominally, in getting hold of the Gas Company's big stock at a high figure—*i.e.*, 3s. 6d. per unit. This move took consumers entirely by surprise; and they discovered all at once how completely they would have been at the mercy of a few audacious speculators, had the latter succeeded in carrying out their little game. Fortunately for them, the Syndicate had no backbone, and speedily collapsed. Having found out the weak point in their position, it is hardly to be wondered at that consumers should then have proceeded to strengthen it, in order to guard against any possible surprise in the future, by laying in a good stock. In this operation they were greatly assisted by The Gaslight and Coke Company, who, apparently quite unconscious of the narrow escape consumers had had by allowing themselves to run down to starvation point, now adopted, as their new policy, the hard-and-fast line never to hold stocks again to any appreciable extent. No one can blame the Company for having got rid of a big stock after the crisis was over; but when, year after year, the full annual make of anthracene regularly disappears, and yet the price goes down further, with perhaps a few spurts occasionally, one may well ask whether the new policy is or is not a huge mistake. When the Anthracene Syndicate was started to take over the Gas Company's stock in 1881, the price was 3s. 6d. per unit; that is, the price was high because regulated by the Gas Company, the holders of the stock. Ever since the stock was transferred, however, the price, own controlled by the consumers, has ruled low—1s. 3d. per unit; and it will remain low as long as the Company are content to feed consumers on their own terms.

Here we have cause and effect with a vengeance; and who is there to deny that, by giving up the stock they formerly held—say, half of the biggest stock they ever held in 1881—The Gaslight and Coke Company did not virtually surrender themselves and the tar distillers, bound hand and foot, to the alizarine makers. And this being proved, the experience of the last ten years' trading fully bears it out. Can The Gaslight and Coke Company quietly submit to remain any longer in this lamentable state of bondage when all the tar distillers in the country desire nothing better than to co-operate in shaking off these bonds?

VERITAS.

*Sept.* 3, 1892.

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## Gas Companies' Accounts.

SIR,—In further illustration of the system of gas companies' accounts which I should like to see adopted, I enclose herewith a form which I think would be far more useful and instructive than the one now generally employed. It does not pretend to be strictly correct; but it is sufficiently so for this purpose. It has been selected to show how easy it would be, under this form (having regard to the extent of the undertaking), to compare the accounts of one company with those of another under all the important items, and to discover any differences, wherever they exist. The several items are set out in single totals, instead of being split up and divided between "manufacture," "distribution," &c., so as to enable anyone to readily calculate the cost per 1000 cubic feet of each item when required. However careful a person may be, there are many items in the accounts which cannot be appropriated correctly; and even if they could be, what would be the use of them at present? They only serve to mystify the accounts, and occupy uselessly much of the time of the clerks in setting them out.

W. LIVESEY.

*Gas Companies' Association, 76, Palace Chambers Westminster, S.W., Aug.* 30, 1892.

[ENCLOSURE.]

*Half-Yearly Account to the 31st of December.*

| Cost per 1000 cub. feet. | Cost of Production. | £ s. d. | £ s. d. | Average Sales per 1000 c. ft. | Sales, &c. | £ s. d. | £ s. d. |
|---|---|---|---|---|---|---|---|
| | *Coals.* | | | | *Gas.* | | |
| s. d. | Carbonized and used on works, | | | s. d. | Private consumers cub. ft. | 46,886 0 0 | |
| 1 9½ | 45,430 tons, averaging 16s. per ton | .. | 36,375 0 0 | | Public lamps lamps, estimated at cubic feet per lamp. . . . „ | 4,086 0 0 | |
| | *Working Expenses.* | | | | | | |
| | Materials for purifying . . . . | 1,120 0 0 | | 2 6½ | Total gas sold 400,400 cub. ft. | .. | 50,972 0 |
| | „ for sulphate . . . . | 200 0 0 | | | | | |
| | Cartage of products . . . . . | 110 0 0 | | | *Products.* | | |
| | Repair and maintenance— | | | | Coke and breeze . . tons | 12,982 18 5 | |
| | On the works . . . £7,907 | | | | Tar . . . . . gals. | 2,964 0 3 | |
| | In the streets . . . 1,738 | | | | Sulphate . . . . . tons | 1,727 17 1 | |
| | Meters . . . . . 874 | | | | Waste lime, &c. . . | 6 4 3 | |
| | Stoves . . . . . 383 | | | | | | |
| | Public lamps . . . 1,000 | | | | Total for products | 17,681 0 0 | |
| | | 11,902 0 0 | | | | | |
| | Wages for all purposes . . . . | 7,064 0 0 | | | *Miscellaneous.* | | |
| | Salaries . . . . . | 3,954 0 0 | | | Meter-rents . . . . . | 859 8 0 | |
| | Stationery, printing, stamps, &c. | 224 0 0 | | | Stove-rents . . . . . | 340 17 6 | |
| | Office charges. . . . . | 455 0 0 | | | Ordinary rents . . . . . | 28 14 6 | |
| | Rents, rates, and taxes . . . . | 1,650 0 0 | | | | | |
| | Legal expenses . . . . . | 85 0 0 | | 11½ | Total products miscellaneous | .. | 18,910 0 0 |
| | Bad debts . . . . . | 189 0 0 | | | | | |
| | Directors . . . . . | 750 0 0 | | | | | |
| | Auditor . . . . . | 25 0 0 | | | | | |
| | Miscellaneous— | | | | | | |
| | Sick and Superannuation fund | 297 0 0 | | | | | |
| 1 4¾ | Total working expenses | | 28,025 0 0 | | | | |
| 3 2¼ | Total cost of production | | £64,400 0 0 | 3 5¾ | Total sales . . . . . | .. | 69,882 0 0 |
| | | | | | Deduct cost as on other side | .. | 64,400 0 0 |
| | | | | | Transferred to net revenue | .. | 5,482 0 0 |

## Mr. Gadd's Mechanics.

SIR,—As to Mr. Gadd's letter in your issue of the 23rd ult., I cannot afford time to give him, through the medium of the JOURNAL, the instruction of which he evidently stands in need; but I will give your readers who have followed this controversy, a quotation from one of the standard works, to bear out the assertion made in my last letter.

To find the distance apart of the centres of tension and compression respectively:

1. "Divide the section [of the cantilever] into strips [or small areas]."
2. "Multiply the areas in square inches of the strips under tensile stress, by their mean distances respectively (that is the distance of their centre of gravity) from the neutral axis."
3. "Multiply the same areas by the *squares* of their mean distances respectively from the neutral axis."
4. "Divide the sum of the second products (3) by the sum of the first products (2); the quotient is the distance of the resultant centre of tension from the neutral axis."

If the section be symmetrical about the neutral axis, this distance of the centre of resistance to compression will be a corresponding distance from the neutral axis on the opposite side thereof. The distance apart, therefore, of the centres of compression and tension (or thrust and lift) respectively is the sum of the distance of the resultant centres from the neutral axis.

Algebraically expressed, the distance apart of the centres

$$2 \times \frac{a_1v^2 + a_1v_1^2 + a_2v_2^2 + a_3v_3^2, \text{ \&c.}}{a\,v + a_1v_1 + a_2v_2 + a_3v_3, \text{ \&c.}}$$

Now, it is obvious, if all the *areas* be taken as equal, we may write the above thus:—

$$2 \times \frac{a\,(v^2 + v_1^2 + v_2^2 + v_3^2)}{a\,(v + v_1 + v_2 + v_3)}$$

But $a$ and $a$ cancel out; leaving the formula simply—

$$2 \times \frac{v^2 + v_2^2 + v_3^2 + v_4^2}{v + v_2 + v_3 + v_4}$$

for the distance apart of centre of thrust and lift or compression and tension in a symmetrical beam or cantilever, exactly as Mr. Cripps employed it.

It may be asked: Why take *a* as equal? It is for this reason: In Mr. Gadd's holder, the material which has to resist the strain is concentrated at equidistant points round the circumference—viz., the cantilever axles of the bottom rollers, all of which axles are alike, and offer an equal sectional area to resist bending and shearing.

Mr. Cripps is perfectly correct in disregarding the weight of a gasholder when inflated; the weight is entirely absorbed by the *upward pressure of gas*. It is lifted off its legs, so to speak, and is not the same as if it were merely standing on the ground empty of gas, and exerting all its weight in opposition to overturning. The resultant strains on the tank-guides and bottom rollers are those due to treating the holder as entirely without weight in Mr. Gadd's construction. The inner lift of a telescope holder has assistance from the hanging ones, tending to keep it level (as Mr. Cripps long ago demonstrated); but there is nothing to weight down the bottom or outer lift.

It may be worthy of remark that, although in Mr. Gadd's holder it must be treated as like an inflated balloon—with nothing to preserve it vertical, or resist its strains, but the rigidity of the bottom curb, the strength of the bottom roller axles and tank-guides, to which points the whole straining action of the holder is finally transmitted—it is very different with gasholders having guide-framing independent of the working bell. In the latter type, the weight of the guide-framing is an important factor in preserving equilibrium; the whole of its dead weight helps to resist overturning, because it is not "lifted off its legs" by the gas pressure. In Mr. Gadd's holder, however, not one atom of the weight of the structure is efficacious in helping the holder to resist the strains upon it.

Doubtless Mr. Gadd may in a year or two's time advance the above as if it were something very original on his part, just as in his last article he attempted to prove that the inner lift of a gasholder will not tilt when the outer lift is hanging on it—a thing which Mr. Cripps proved some years ago. If Mr. Gadd ponders over this, he will see there is something for him yet to learn; and moreover that it behoves him to be more cautious in the language he uses when attacking others in the gas engineering world, simply because they differ from him, or are unknown to him. He should remember that it is not so very long ago since he was an unheard-of factor in gas engineering. The most charitable view to take of Mr. Gadd's attacks on others is to ascribe it to lack of knowledge of the principles of mechanics on his part. If he is not ignorant, then he would appear guilty of a most tricky distortion of other people's views.

I must decline further discussion. It is sufficient to have held up the finger of warning against the modern embodiment of antiquated error.

*Sep*2, 18 92. R. J. MILBOURNE.

[We have no wish to check any controversy that can be regarded as fruitful of instruction to our readers; but we must ask our correspondents to observe the amenities of discussion, and to remember that the proper object of debates upon technical matters is the elucidation of truth, not the confusion of partisan by partisan. This correspondence has proceeded along the narrow border-line that divides acerbity of argument from barren personalities. If it is to be continued, its tone must be changed.—ED. J.G.L.]

**"Smokeless London."**—We have received a letter on this subject from Mr. Thomas Fletcher, who, referring to our remarks last week in closing the discussion on the above subject which has lately been going on in our "Correspondence" columns, thinks that, as a matter of simple justice, he should be allowed to reply to Mr. D'Oyle's last letter, containing as it does queries which, if unanswered, would, he says, leave a very wrong impression in the minds of many readers. Dealing first with Mr. D'Oyle's statement that the firm of which Mr. Fletcher is the principal member make "cheap and inferior" articles, "well knowing that they cannot give so good a result as those of better construction," he denies that this is so, and states that the cheapest gas-fire they have ever made "gives as high a duty as the most costly, and is as substantially made as the best." He points out that fires combined with warm-air arrangements are naturally more economical than those without them; but of these they have both cheap and expensive kinds—the difference being entirely in the finish. With regard to the various qualities of gas, and the burners applicable therefor, Mr. Fletcher states that his firm have to make burners suitable for water gas, which has no illuminating power, as well as for compressed gas of 45 to 65 candle quality, for both domestic and manufacturing purposes. In reply to Mr. D'Oyle's question, "Does a salesman ask whether a stove has to be used in this town or that?" Mr. Fletcher replies: "Most certainly he does. A burner made for 32-candle gas, as commonly supplied in Scotland, is absolutely useless with London 16-candle gas; and one adjusted for London gas is very unsatisfactory and wasteful if used in Scotland." The burners are, he says, in every case made and adjusted for different towns and districts; and, when constructed for special qualities of gas, they are labelled, as Mr. D'Oyle seemed to think should be done: "This is adjusted for 20-candle gas," or whatever it might be. Replying to Mr. D'Oyle's question as to whether or not thousands of gas-stoves are sent to the Colonies every year "without the slightest regard to the quality of gas that will be burnt in them," Mr. Fletcher admits that the trade in these articles with our colonial possessions is of the extent Mr. D'Oyle states; but he denies most emphatically that the conditions are as that gentleman supposes. His firm make every year a very large number of burners which are totally unfit for London gas. In conclusion, Mr. Fletcher suggests that it might have been well if, before writing on a subject evidently new to him, Mr. D'Oyle had asked the questions he has now put forward. Had this been done, he (Mr. Fletcher) would have gladly given him any information in his power to have prevented him from falling into error.

# MISCELLANEOUS NEWS.

## CRYSTAL PALACE DISTRICT GAS COMPANY.

### The Half-Yearly Report and Accounts.

The accounts of this Company for the six months ending June 30 last, which will be presented to the shareholders at the ordinary general meeting on the 9th inst., show, as the result of the working during that period, a balance of £7874 to the credit of the revenue account. This was reduced, by the payment of interest on the loans and debenture stock, to £7523; thus necessitating the transfer of £7351 from the reserve fund to make up the statutory dividends. In their report, the Directors remark that, if the large reserves accumulated during the last twenty years had not been available, it would have been necessary to charge a much higher price for gas, as an addition of about 5d. per 1000 cubic feet would have been required to realize sufficient to pay the statutory dividends; whereas the reserves have been drawn upon, since March, 1890, to the present time, to the large amount of £38,399—thus, to this extent, saving the consumers from an increase in the price of gas. The extra cost for coal, in consequence of the Durham miners' strike, was £2687; and the amount realized for coke and sulphate shows a decrease of £4036, as compared with that of the corresponding half year of 1891. Coke is still selling at a low price; and the tar contracts having been renewed at much lower rates, the Directors state that no improvement can be anticipated under the head of tar for the next year. The contracts for coal for the forthcoming twelve months' supply have been made on favourable terms, and will naturally improve the revenue account for the current half year. There has been an increase of 2·23 per cent. in the quantity of gas sold over the corresponding six months of 1891, which is satisfactory when it is remembered that it follows a rise of 12·87 per cent., due to the abnormally severe weather of the early part of last year. The whole of the £37,500 of 6 per cent. debenture stock has been allotted, and 5s. in the pound paid thereon, amounting to £9375. The Directors recommend a dividend for the half year at the following rates per annum: 6 per cent. on the preference stock; 7 per cent. on the ordinary 7 per cent. stock; and 10 per cent. on the ordinary 10 per cent. stock—amounting to £14,875, less income-tax. The accounts accompanying the report show that the receipts for gas amounted to £55,621, as compared with £52,907 in the six months ending June 30, 1891; those for meter and stove rental, to £1233, as against £1157; residuals realized £16,744, as compared with £19,443; and the total receipts were £73,631, as against £73,538. The chief items of expenditure in the past half year were: Manufacture of gas (coals costing £38,976), £55,241; distribution, £4051; management, £3072—the total being £65,756. The corresponding items for the first half of 1891 were: Manufacture of gas (coals costing £42,011), £57,984; distribution, £4076; management, £3126—total, £69,891. From the portions of the accounts which relate to the manufacturing operations, we find that 45,696 tons of coal, 675 tons of cannel, and 11,706 gallons of carburine were employed in the production of gas, of which 463,691,000 cubic feet were made, and 429,851,000 cubic feet accounted for. The residual products were: Coke, 556,452 cwt.; breeze, 5202 yards; tar, 463,612 gallons; ammoniacal liquor, 927,420 gallons. The Company work up the last-named product; the quantity of sulphate made in the past six months being estimated at 385 tons. The capital account has been increased by the £9375 of 6 per cent. debenture stock referred to in the report; making the total receipts to June 30 last £409,375. The total expenditure at that date was £388,687, of which £4689 was incurred in the period covered by the accounts; the bulk of it (£3177) being for buildings and plant.

## TOTTENHAM AND EDMONTON GAS COMPANY.

The Ordinary General Meeting of this Company was held last Saturday week, at the Offices, Willoughby Lane, Tottenham—Mr. G. GRIPPER in the chair.

The SECRETARY (Mr. J. Randall) read the notice convening the meeting; and the report and accounts for the past half year were taken as read. The latter showed that the total quantity of gas sold (including the public lighting) had been 146,026,100 cubic feet, which produced the sum of £22,861. The rental of meters and gas-stoves amounted to £617. The residual products realized £5938; and two or three small items made the total receipts £29,446. The manufacture of gas cost £17,892; distribution, £1479; lighting and repairing public lamps, £594; rents, rates, and taxes, £1410; management, £1652; and minor items brought the expenditure up to £23,307. The balance carried to profit and loss account was £6139; and after paying interest on loans, debenture stock, &c., the amount available for dividend, including the undivided balance of £1148 brought forward, was £6500, of which the dividends of 11½ and 8½ per cent. recommended by the Directors would absorb £6264.

The CHAIRMAN, before addressing the shareholders upon the report and accounts, thanked them sincerely for the letter of condolence which was forwarded to him after the meeting in March last, at which time he was very ill, and was confined to his bed for about fifteen weeks. With regard to the statement of accounts, he believed the proprietors would consider that the course of business had been generally satisfactory. They had maintained the increase of 3·44 per cent. in the sale of gas, which was about their usual rate. The corresponding period of last year was, of course, exceptional, on account of the continuance of foggy and bad weather, which raised the gas-rental above its normal average. As to the coal carbonized, they were able to congratulate themselves upon having used up all the coal purchased under the old contracts. They had now entered into new contracts on more favourable terms; and they trusted that, combined with the hope (although possibly it might be hope deferred) of an increase in the value of the residuals, this would enable them to earn more money during the current year. The gas-stove business was an important feature in their Company. The number of stoves out on hire was

being gradually augmented; and, consequently, the increase in the consumption of gas in this direction brought them in a considerable revenue. Compared with the corresponding period of last year, there had been an increase of 78 stoves. Having stated that the Engineer (Mr. W. H. H. Broadberry) reported that the plant had been kept in efficient and complete order, the Chairman proceeded to remark that the Directors had thought it expedient to issue, under the powers conferred upon them by the Company's Act of 1882, debenture bonds for £4100 bearing interest at the rate of 4 per cent. For some time past, they had had to draw upon their bankers; and the issue of debentures would stop the necessity for this. He concluded by moving the adoption of the report and accounts.

Mr. H. Bailey said he understood the Company did not let out gas heating-stoves; and he asked whether it was not advisable that they should do so.

The Chairman replied that he had been under the impression that they let out on hire both classes of stoves. But he was informed they did not; and the matter should receive the attention of the Board.

Mr. G. T. Watson asked whether in future they could not obtain a little premium on the debenture stock when it was issued. Seeing that they paid 4 per cent. interest on it, this stock was not to be despised; and he certainly thought they ought to get a better price for it than par.

The Chairman said he should not like to prophesy what they would be able to get for this stock in the future; but, of course, he should like to see a better price paid for it.

The motion, having been seconded by Mr. Watson, was unanimously carried.

Mr. Corbet Woodall moved the declaration of dividends on the "A" stock at the rate of 11½ per cent. per annum, and on the "B" and "C" stocks at the rate of 8½ per cent., all less income-tax. He said he had much pleasure in proposing these dividends, because, while the amount to be divided had not been quite earned in the half year, yet they were in a position, as he had occasion to remark at their last meeting, to pay several half-year's dividends, owing to the policy of the past in putting by some of their earnings against troublous times. The half year just ended had been a trying one for all gas companies. The price of coal had continued high; and, almost without example in the history of gas companies, the value of residual products had remained low. It was the usual experience in gas manufacture that, when the price of the raw material went up, so did also some of the secondary products resulting from it; but the statement they had before them showed that, while there had been a less amount paid for coal (rather more than £1000, due to a reduction of 1s. 4½d. per ton)—while the quantity used was pretty nearly what it was in the June half of last year, the amount received for residuals had been 10 per cent. less. Not only had coke gone down, but the price of ammonia had dropped, until now they were selling it under £9 10s. per ton, whereas, a comparatively short time ago, they realized £20. Tar also had followed the same evil course; and they had had to sell it for the coming year at a considerable reduction on what they had recently received. While many companies around them had found it necessary to raise the price of gas in order to maintain their dividends, the Tottenham Company were in the happy position of being able to recommend the same dividend as before, without having recourse to the disagreeable process of increasing the price. Now that the cost of coal was somewhat less, and if the consumption of gas continued to grow—and there was evidence that it would do so—he had no doubt whatever that they would shortly see a balance to the good, after paying the dividend, and so they might be able to look forward to a further reduction in the price of gas at no distant time.

Mr. Bailey seconded the motion, which was unanimously agreed to.

The Directors retiring by rotation (Sir Henry Cartwright and Mr. J. Malcolm) having been re-elected,

The Chairman said the next business was the appointment of an Auditor. Mr. A. Nicol, the gentleman retiring, offered himself for re-election; but this was a matter for the shareholders.

Mr. Bailey said he thought it was time they had a younger man in the place of Mr. Nicol, who, for some time past, had very rarely attended their meetings. He should therefore propose that Mr. G. T. Watson be appointed to fill the position.

Mr. Moore seconded the proposition, and it was passed.

Mr. Watson said this motion had come as a surprise to him; but, as it was the wish of the proprietors that he should occupy the post, he would not shirk the responsibility.

A vote of thanks was then accorded to the Chairman and Directors, on the motion of Mr. Moore, who said that there was every prospect of the Company's business largely expanding in the future. As one of the representatives of the district, he might say that building was going on very fast; and they recently had plans before them for the erection of 800 houses on one estate.

The Chairman having acknowledged the compliment,

Mr. Woodall proposed, and Mr. R. P. Keys seconded, a vote of thanks to the officials; and it was heartily agreed to.

Mr. Randall and Mr. Broadberry returned thanks—the former gentleman mentioning that that was the forty-first anniversary of his connection with the Company; and the latter, remarking upon the increase of the Company's business, pointed out that the consumption of gas during the past six months was as nearly as possible the same as during the whole of 1881.

This concluded the proceedings.

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**The Rosario Gas Company and the Municipality.**—A curious state of things is reported from Rosario; the Gas Company having informed the Municipality of the town that they will cut off the supply of gas if their account, for $20,000, for lighting is not promptly settled.

**Sale of the Kirton-in-Lindsey (Lincs) Gas-Works.**—In accordance with an announcement which appeared in the Journal a few weeks ago, the gas-works and plant at Kirton-in-Lindsey, in Lincolnshire, were last Wednesday offered for sale by public auction, as a going concern, by Messrs. Spring and Son, Auctioneers, at the George Hotel in that town. After a very spirited competition, Mr. R. Little, of Summerhill Street, Newcastle, became the purchaser.

## PROVINCIAL GAS AND WATER COMPANIES.

The following paragraphs contain particulars relating to the working of the Provincial Gas and Water Companies mentioned.

### Gas Companies.

At the meeting of the Abingdon Gas Company last Thursday, the Directors reported a balance of £1036 available for division; and they recommended a dividend at the rate of 5s. each on the original shares, and of 3s. 6d. each on the "B" shares. This absorbed £345, and left a balance of £691 to be carried forward.

The half-yearly meeting of the Ascot District Gas Company was held last Tuesday at the Guildhall Tavern, Gresham Street, E.C. The accounts showed that the receipts for the past six months amounted to £1814; and the expenditure to £1293. The Chairman (Mr. R. Berridge, Assoc.M.Inst.C.E.), in moving the adoption of the report, said the profit on the half-year's working was £521, which, added to the balance of £754 brought forward, made £1109 to the credit of the profit and loss account, out of which sum the Directors recommended a dividend at the rate of 2 per cent. per annum. They were disappointed they could not propose a dividend of 2½ per cent., as paid in the previous half year. The 2 per cent., however, would be paid out of the profits of the half year; and they did not think it advisable to pay the extra ½ per cent. out of money which had not been earned in that period. If they could get the price of coal reduced, they would be able to pay very shortly a dividend of 2½ per cent., if not 3 per cent. In the manufacture and distribution of gas there had been savings; but in other items of expenditure there were slight increases. On the other hand, the receipts from gas had advanced by £100; but for residual products they had not realized the amount which they had hoped to do. Therefore they carried to profit and loss account, a slightly reduced balance. In conclusion, he mentioned that during the half year they had held two exhibitions, the results from which he regarded as very satisfactory. The number of consumers at June 30, 1891, was 283; and on the same date this year, 299. Mr. Alfred Williams seconded the motion. Replying to Mr. F. Bridges and Mr. S. Spencer, the Chairman stated that, in round figures, the average production of gas per ton of coal carbonized was 9000 cubic feet; and of this they were paid for rather more than 8700 feet. The average number of consumers per mile of main was only 26; so that, considering the length of their mains, there was sure to be a great waste of gas. The percentage of gas unaccounted for was 12·2. On the motion of the Chairman, seconded by Dr. Strong, the dividend recommended was declared; and after the usual votes of thanks to the Directors and the Secretary (Mr. W. Liddall) and the Manager (Mr. W. G. Hicks), the proceedings terminated.

At the annual meeting of the Cwmbran and Pontnewydd Gas Company, Limited, held at Newport (Mon.) on the 27th ult., a dividend at the rate of 2 per cent. was declared for the half year ending June 30 last; thus making, with the interim dividend of similar amount paid to Dec. 31, 1891, a total of 4 per cent. for the year. It was announced that the Directors, acting upon a report made by the new Manager (Mr. T. H. White), were having the works thoroughly overhauled and repaired, so that better results may confidently be looked for at the next audit of the accounts. The usual votes of thanks were passed to the Chairman and Directors.

The half-yearly meeting of the Douglas Gas Company was held yesterday week. The Directors, in their report, stated that, notwithstanding the falling off in the price of residual products, the consumption of gas and the consequent profit had been increased by the letting out on hire of gas cooking-stoves. Out of the profits of £3413, the Directors recommended the payment of the usual dividend of 27s. 6d. per share. The report and balance-sheet were adopted.

The annual meeting of the Hartlepool Gas and Water Company was held last Wednesday, when the Chairman (Mr. W. H. Fisher), had a very gratifying statement to make to the shareholders. He said that the make of gas had steadily advanced during the past year, and had reached 259 millions. The profits had not kept pace with this, owing to the larger outlay for coal, caused by the recent disastrous strike of miners in Durham. But with due regard to economy and vigilance on the part of the Directors, they had been enabled to make a profit on the year, and even carry forward a balance. The gas-rental amounted to £28,853, or an increase of £2154. The residuals were more favourable than might have been expected considering the low prices now obtainable. These showed a net increase of £315; but as they had carbonized 27,778 tons of coal—being an increase of 3244 tons—the receipts should have been largely augmented. The revenue for water showed a satisfactory advance; but here again the necessary increase in the expenditure had somewhat reduced the results. They had sold 311 million gallons of soft, and 80 million gallons of hard water for manufacturing purposes; and 319 million gallons for domestic purposes. They had a water-tank approaching completion which was some 30 feet higher than the old one, and would contain about 400,000 gallons. Turning to the capital account, he said that five years ago the capital was £278,000, with a net income, after payment of interest on the mortgage, of £14,074; and this only enabled them to pay 5½ per cent. all round. This year they had a capital of £303,000, and the net income was £21,739, which allowed them to declare the dividend they did. They were now erecting a new holder, the diameter of which would be 152 feet, and the depth 30 feet, and would be capable of storing a million cubic feet. This could be added to when required by a lift, which would increase the capacity by another 500,000 feet. All the present gasholders combined would only store 1,150,000 feet; and when he mentioned that the consumption during one day last winter reached 1,510,000 cubic feet, they would realize the arduous duties imposed upon their Engineer (Mr. T. Bower). The report was adopted; and dividends of 8½, 7½, and 7 per cent. on the various classes of shares were declared. It was also agreed that the salary of the Secretary (Mr. T. Trewhitt) should be increased by £100 per annum.

The Directors of the Hastings and St. Leonards Gas Company, in the report which they submitted to the shareholders last Thursday, remarked that the unfortunate strike of the Durham miners in the early part of this year necessitated the purchase elsewhere of coal at

an increased price during a period of three months; and the general depression and stagnation of trade produced by that strike caused a considerable falling off in the value of residual products, which had been felt all over the country. Therefore, under these circumstances, they were gratified in being able to report that the statutory dividends had been earned. The working of the half year had given them a profit balance of £9536, which, with the balance brought forward from the previous half year, amounted to £38,883; and from this they proposed a dividend at the rate of 12 per cent. per annum on the £25 shares, and at the rate of 9 per cent. on the £20 shares. The revenue account showed that the receipts for gas had been £26,963; for meter and stove rental, £1096; for residual products, £7426; and rents and miscellaneous receipts made a total income of £35,636. The total expenditure amounted to £26,100, of which the principal items were: Manufacture, £22,275; distribution, £1189; lighting and repairing public lamps, £533; rates, taxes, and insurances, £841; and management, £1074. The report was adopted.

The Keswick Gas Company hold their annual meeting to-day. The accounts to June 30 last show a sum of £1652 available for division—being £955 the balance on the year's working, and £697 brought forward. The Directors propose to set aside £100 to the depreciation fund, and to declare a dividend at the rate of 8½ per cent. per annum on the original, and of £5 19s. on the additional capital. This will absorb £816, and leave £736 to be carried forward. The revenue from the sale of gas and the hire of meters and stoves amounted to £2185; the total receipts being £2653. The expenditure on the manufacture and distribution of gas came to £1440; and the total expenses were £1698.

At the ordinary general meeting of the Kingston Gas Company last Thursday week, the Directors reported that the business was in a very satisfactory state; the decrease in the profit made during the past half year being mainly attributable to the reduction in the price of gas at Christmas last. The works and plant were in perfect working order; and with the extension of the retort-benches, and the addition of a new engine and exhauster, now being erected, they believed the increased demand for gas would be fully met. The re-issue of mortgage bonds (amounting to £5500), sanctioned at the last meeting of the shareholders, had been carried out, thus reducing the loan capital to £8500. The Directors recommended the payment of the usual dividends. The profit for the half year was £4376. The report was adopted.

The profits of the Lewes Gas Company for the past half year amounted to £1387; and after providing for interest on mortgages, &c., the balance of net revenue was £1908. From this sum a dividend of 5 per cent. has been declared.

The shareholders of the Newmarket Gas Company held their annual meeting yesterday week. The accounts which were submitted showed that the receipts had amounted to £10,588, and that there was a net balance of profit available for division of £3383. The Directors recommended a dividend at the rate of 11 per cent. upon all the capital. This would absorb £2970, and leave £413 to be carried forward. The Chairman (Mr. C. Diver), in moving the adoption of the report, made a few congratulatory remarks on the continued prosperity of the concern. The report was adopted; and the remuneration of the Directors was afterwards increased—the Chairman's to £25 per year, and the other Directors to £20. In acknowledging a vote of thanks, the Chairman said their works (which are under the management of Mr. J. H. Troughton) would bear comparison with any in that part of the country for miles round.

As the result of the working of the Pontefract Gas Company during the past six months, there is a sum of £1584 available for division among the shareholders, out of which the Directors recommend the payment of a dividend at the rate of 10 per cent. per annum on the original shares and 7 per cent. on the new ordinary shares.

In addressing the shareholders of the Richmond Gas Company at the half-yearly meeting last Thursday week, the Chairman (Mr. T. J. Carless) stated that the report was not so good as usual; but, under the circumstances, he regarded it as very favourable, and the full dividends would be paid. Referring to the explosion of gas which took place in May last (and which was noticed in the JOURNAL at the time), he said this had been a source of considerable expense to the Company; but he was glad to say no life had been lost through it. As to the accounts, during the half year the expenditure on capital account had been £1275, the chief items of which were for additions to the retort-house, new mains, and gas-stoves. The capital had been increased by £5542 by the sale of £4000 of "C" stock in April last, which produced an average price of £139 7s. 3d. per cent. Turning to the revenue account, he said that 716 more tons of coal had been used, with an increase in the amount paid of £283, which showed very good management on the part of their Engineer (Mr. T. May). The repairs and maintenance of works showed a decrease of £193, though the amount included an item of £806 due to the explosion already alluded to. The receipts exhibited a small increase in the sale of gas; while for tar £470 less had been received, which was entirely due to the fall in the market price. The amount realized by sulphate of ammonia was £56 more. The profit and loss account showed a balance of £2952. The Directors looked forward with hope to the future, as they had entered into new contracts for coal at a less price. They would, however, have to follow the lead of their neighbours, and increase the price of gas by 3d. per 1000 cubic feet from Michaelmas next. The report was adopted; and dividends were declared at the rates of 5 per cent. on the "A" and "B" stocks and 3½ per cent. on the "C" stock for the half year.

At the half-yearly general meeting of the Rugby Gas Company last Tuesday, the report submitted by the Directors stated that the receipts on the revenue account for the year ending June 30 last amounted to £5832, and the expenditure to £4143; leaving a balance of £1689 to be carried to the profit and loss account. This amount, added to the balance after payment of the dividend for the previous half year, &c., formed a net balance of £4893. An interim dividend for the past half-year at the rate of 11 per cent. per annum was recommended, amounting to £1644; the balance to be carried forward. The Directors have arranged to borrow on mortgage, at 3½ per cent., the sum (£9000) authorized by the Company in December last, out of which the £7000 previously borrowed will be repaid. They expressed regret to report the retirement of Mr. Peter Simpson after 38 years' most efficient services as Manager and Engineer of the Company; and the sum of £100 was voted to him in acknowledgment of his services, with the Company's best wishes for his future happiness. The report was adopted.

In the report which the Directors of the Sunderland Gas Company will present to the shareholders at their annual general meeting to-morrow, they announce with pleasure an increase of 4·12 per cent. in the consumption of gas. This, in view of the fact that it is sold at a much lower rate than in previous years, they think may be regarded as fairly satisfactory, considering the exceptional labour troubles which prevailed during a part of the past twelve months. The receipts for gas and meter-rents in the year ending June 30 last amounted to £56,463; residuals producing £22,237. In 1891 these figures were £53,856 and £24,015. Coals, &c., cost £31,832, as compared with £34,999; and wages, £17,740, instead of £16,719. The total revenue for the year was £79,067; the expenditure, £64,826—leaving a balance of £14,241. An interim dividend was paid in March last; and the Directors now recommend one of like amount—viz., 5 per cent. on the old, and 4¾ per cent. on the additional stock. Referring to the strike of Durham miners, the Directors remark that, the supply of coal being drawn entirely from that county, the protracted struggle would have entailed much more inconvenience and expense than has resulted therefrom had they not taken the precaution to accumulate a very large stock, which enabled them, with the addition of a few thousand tons bought in other markets, to tide over the difficulty. The extra amount paid for coals during the period of the strike was £1057.

The ordinary meeting of the Wolverhampton Gas Company was held last Tuesday, when the Directors reported that there was a net profit on the half-year's working of £4706, which, added to the balance brought forward, made £4755. The Directors recommended the payment of the usual dividends, and proposed to make up the amount required from the reserve fund, which amounted to £3764. The Chairman (Mr. H. W. Owen) said the Directors were quite satisfied that next half year they would not only make the dividends, but would have something to carry forward to the reserve fund. They did not propose to advance the price of gas at present, as they believed they would be able to buy coal cheaper than they did last year. It would be necessary for them to apply for an Act of Parliament next session to enable them to raise more capital, as they found it advisable to extend their works. A scheme was being prepared with this object in view. He moved the adoption of the report, which was agreed to; as was a proposition that a 5 per cent. dividend be paid on the consolidated stock, and 5 per cent. on the preference shares. The Chairman then moved a vote of thanks to the Manager (Mr. J. Annan) and the staff. In seconding the motion, Mr. Ward intimated that the Directors had been approached by the Corporation in respect to a sale of the works, and negotiations were still in progress. The vote was agreed to. Mr. Annan, in reply, said the Corporation appeared to be going into the electric light business; but perhaps this would be to the advantage of the Company, because, wherever the electric light was used, a tremendous amount of gas was consumed. The Company were now supplying 100 gas-engines, 400 to 500 gas cooking-stoves, and a large number of heating-stoves in the town. They were not, therefore, likely to suffer much harm from the electric light.

### Water Companies.

The steady increase of the business of the Leatherhead and District Water Company still continues. The report submitted at the recent meeting of the shareholders showed that the receipts for the past six months amounted to £1017—a larger sum than had been reached in any previous half year. The working expenses were £521; leaving a profit of £496, which, with the balance brought forward, made a total of £629. Deducting from this the interest on the debenture stock, a sum of £505 was available for division. The profits amounted to within a few shillings of the sum required to pay a dividend of 3 per cent. per annum; but, as the Directors were of opinion that it was desirable to accumulate a fund to meet contingencies, they recommended a dividend at the rate of 2½ per cent. per annum. The Chairman (Mr. H. Rokeby Price), in moving the adoption of the report and statement of accounts, said they had had a successful half year. They had reached the end of their original capital, and had applied to the Board of Trade for an Order to enlarge the capital. It was not increased to the extent they wished; but they had to take what the Board of Trade gave them. Their district was increasing; and, as far as they could see, there was the prospect of a very good return for their outlay. The report and the recommendation as to dividend were adopted.

The half-yearly meeting of the Woking Water and Gas Company was held last Tuesday, at the offices of the Company, 5 and 6, Great Winchester Street, E.C. The report and accounts (which were noticed in the JOURNAL last week) having been taken as read, the Chairman (Mr. C. Horsley), in moving the adoption of the report and accounts, said he had first of all to express regret at the resignation of their esteemed Chairman, Colonel Galt. From the commencement of the Company, no one had given more time and attention to the business than he had done; and, having been Chairman for a time and a Director of the Portsmouth Water Company, he was eminently qualified to preside over their affairs. With reference to the accounts, it would be seen that the expenditure on capital account amounted to £69,202. The revenue for the half year was £2171; and the expenses on revenue account, £894. The profit on the working was therefore £1276; and the sum available for division was £1148. Notwithstanding that the price of coal and other things had been against them, they had earned their dividend of 4 per cent. There were many water companies who, in their early days, did not earn dividends of 4 per cent. so soon as they had done. Their district was being steadily covered; the rental was growing; and they hoped in time to pay a larger dividend. Under these circumstances, he trusted the shareholders would be satisfied with the position of the concern. Their springs were yielding a large amount of water; and they had a well at West Horsley which, a short time ago, drowned them out; and they had to put another pump down. These works had been carried out, with the most satisfactory results, by their Engineers (Messrs. J. Quick

and Son). The water was now coming in as rapidly as they had expected; and if the adits were driven a little farther, they would get a larger quantity. Mr. R. Hesketh Jones seconded the motion. Replying to Mr. Hankey, the Chairman said that the negotiations respecting a supply of water to Frimley were still proceeding; and they had offered to supply the district on condition that water-rates to the extent of 10 per cent. on the capital expended were guaranteed. When an agreement was arrived at, the shareholders would be called together for the purpose of authorizing the raising of the necessary capital. The dividend recommended was declared; and a vote of thanks was passed to the Chairman and Directors for their services.

The working of the Lewes Water Company during the year ending June 30 last resulted in a profit of £1841. The interim dividend paid in February last absorbed £815; and, on the recommendation of the Directors, dividends of 5, 3½, and 2½ per cent. have been declared on the various classes of stock; and, in addition, it has been agreed to pay the holders of the original shares the sum of 15s. per share in part payment of the arrears due to them.

## THE PROPOSED EXTENSION OF THE BELFAST CORPORATION GAS-WORKS.

### Reports by Messrs. Corbet Woodall and W. Foulis.

A Meeting of the Belfast Town Council was held yesterday week to consider reports by Mr. Corbet Woodall, of London, and Mr. William Foulis, of Glasgow, on the sites which had been offered for the extension of the gas-works; and, after a protracted discussion, it was arranged, before coming to a decision on the matter, to place the facts before the public. The Corporation Gas Engineer (Mr. J. Stelfox) was also instructed to prepare a report from his point of view.

Mr. Woodall commences his report by referring to the exceptionally rapid growth of the demand for gas in the city. He says that in 1872, shortly before the Corporation acquired the undertaking of the Gas Company, the quantity of gas made was 410 million cubic feet; while in 1891, it was 1038 millions—a gain of 153 per cent. in nineteen years. This growth appears to have been tolerably uniform; and the record of recent years shows no sign of its interruption. The percentages of increase have been for the last nine years as follows: 1883, 5·5; 1884, 2·6; 1885, 8·0; 1886, 5·8; 1887, 3·6; 1888, 8·3; 1889, 6·3; 1890, 7·8; and 1891, 6·2. The total for the nine years is 58 per cent.; the average compound rate is over 6 per cent. per annum, which means a doubling of the business in less than twelve years. The average for the past four years is over 7 per cent. increase; and this rate, if maintained, would show a doubled business in ten years. The maximum daily delivery from the works exhibits an increase of about the same rate. Last winter the largest quantity delivered in twenty-four hours was 6,679,000 cubic feet. On this day of great demand the supply was checked, or the output would have been considerably greater. Mr. Woodall has no hesitation in saying that the works are now much overtaxed. Very nearly all the retorts available were in use last winter; the margin being much less than is requisite as a provision for contingencies, and yet it was necessary to reduce the ordinary pressure of the gas as supplied, and so diminish the business done. The purifiers also have an area barely one-half of what is needful for the economical and efficient purification of the gas. If the area of the gas-works were large enough, these deficiencies could be readily made good; but it is palpable to the least informed observer that the land is already so overcrowded that there is not room for the business at present done, much less for an extension of it. It appears to be especially necessary in Belfast to keep a portion of the coke made in winter to meet the demand at the factories in summer. For this purpose, some yard space is required; but it is not available, except to a very insufficient extent; and the coke, therefore, blocks the works, and renders locomotion over them difficult. The coal-stores are also insufficient for the present output. These are deficiencies so serious that they cannot be neglected. It is hardly possible, remarks Mr. Woodall, that an adequate supply of gas of good quality can be provided for the winter of 1892-3. Certainly it will be a period of the gravest anxiety for the Committee and their Engineer. He is aware that a new retort-house is in course of erection, which will be ready for use in the winter of 1893-4. This, however, while enabling a larger quantity of gas to be made, will add to the embarrassment of the works. It covers a large proportion of the too limited yard space hitherto available; and it will, of course, need to be fed with coal, and will put out further quantities of coke in proportion to the gas made. It is not sufficient to say that the time has come when more land is essential—it was imperatively called for several years ago. Turning now to the question of new works and additional land, Mr. Woodall's attention was directed to six plots said to be available, and which were of sufficient area. Having specified the positions of the land, he states the considerations which must be borne in mind in selecting a site for the new gas-works. With the conditions he lays down in view, he has no difficulty in eliminating four of the sites named; thus reducing the choice to only two, which differ greatly in their characteristics—(1) reclaimed land on the estate of the Harbour Commissioners; and (2) the low-lying land forming the N.W. portion of Ormeau Park. The land offered by the Harbour Commissioners is partially reclaimed; and its general level is about 12 feet below the building level required by the Corporation, although the character of the subsoil, as disclosed by the borings, is fairly good. Having regard to the nature of adjacent works, it would be necessary to carry the foundations down to a depth of about 10 feet below the present surface. The sand overlying the clay would, in Mr. Woodall's opinion, furnish a sufficiently good foundation were it not that the water which it contains might be drained during the construction of docks or similar works in the neighbourhood, in which case buildings upon it would probably suffer severely. Adding this depth of foundation to the 12 feet necessary to bring the ground line up to the municipal level would make the cost of buildings and foundations for plant very heavy; and to this must be added the cost of depositing material for the purpose of levelling up the whole area brought into use. The suitability of this land for the purpose required depends entirely upon the carrying out of a work which he understands is not yet definitely decided on. He refers to the new cut from the old river channel, which will, if constructed, pass to the east of the ship-building yards, and between them and the land in question. If this cut is made, the Gas Committee would be able to bring coal vessels alongside a wharf in immediate communication with their coal-stores and retort-houses, into which the coal would be delivered direct; and by this means there would be a saving of 7d. per ton of coal. The proposal before the Committee is to provide for the erection of works equal to an ultimate make of 20 million cubic feet daily. In Mr. Woodall's opinion this is not more than should be kept in view when determining the area of land to be acquired. For the purpose of this estimate, however, he assumes the erection of works and plant equal to a make of 10 millions daily, or, say, 1800 millions annually. This will involve the purchase of, say, 180,000 tons of coal; and the saving at 7d. per ton would be £5250 per annum. Against this, he sets an estimated loss of 1s. per ton upon half the coke made for sale—say, 45,000 tons—which amounts to £2250—leaving a net gain of £3000. The cost of works of this size, equipped complete, if built on the land in question, would be approximately £680,000. Of this Mr. Woodall estimates the cost of extra foundations at £64,000; retaining walls and special works towards the lough, £10,000; levelling up land, £29,000—in all £103,000. Allowing 5 per cent. on this amount for interest and sinking fund, taking nothing for profit, the annual charge is £5160—considerably more than the saving upon the carriage of coal. Mr. Woodall says he deals at some length with this site, because it seems to be the only practicable alternative to that in the Ormeau Park; but he reminds the Gas Committee that it is of no value for their purpose unless and until the new cut is made. Coming to the Ormeau Park site, he has no hesitation in saying that it is beyond comparison the best of those available. The trial holes show that no excavation will be necessary to secure a good foundation. The water communication is good; and it is well situated as a distributing centre for both gas and coke. He well understands an objection being raised to the alienation of land dedicated to the use and enjoyment of the inhabitants and the erection of a factory upon it. But it seems to him this objection loses its force when, as in this case fortunately happens, the Corporation are able to offer in exchange for what is proposed to be taken an equal area of vastly superior value. He assures the Committee that there is no reason why such works, erected where proposed, should detract from the usefulness or sightliness of the park. Where the area at disposal is too small for the work to be done upon it, nuisance is likely to tread on the heels of overcrowding. But when, as in this case, land enough is available to allow of setting out with a view to appearances and the avoidance of offence, he is satisfied that the citizens would have no cause to object to their gas-works being in evidence. The works would be separated from the park by the proposed new road; and, if considered desirable, by a belt of trees or banks of evergreens. The manufacturing portion and coal-stores could be kept to the western end of the land, and would then be little nearer to the park than are the present gas-works on the opposite side of the river. Works of the size proposed would be built for a less sum, by at least £100,000, on this land than on that at the harbour. Further, the Committee might confidently expect that works on the park land would be built without failures or without extras. On either of the other sites, it would be the duty of the Engineer to take full and costly precautions against settlement or failure; but the contingency would always be present and possible. Concluding his report, Mr. Woodall congratulates the Corporation upon possessing an undertaking so prosperous as their gas-works, and which so fully justifies confidence in its continued development.

In his report, Mr. Foulis agrees that the necessity for the Corporation acquiring ground for additional works is very urgent. It is impossible to further extend the present works—they are now much too crowded for economical working. New works cannot be constructed in less than two years; and at the rate at which the gas consumption is increasing in Belfast, he says that the producing power of the existing works will be completely exhausted before gas can be manufactured on a new site. Like Mr. Woodall, he is of opinion that only the ground offered by the Harbour Commissioners, and the low-lying land at Ormeau Park are suitable for new works. With regard to the Harbour Commissioners' ground, he says that, unless the proposed harbour extension is carried out in the near future, he does not think this site need be further considered. A secure foundation could only be obtained on the land by a large outlay; and it would probably be found necessary to put the gasholders in iron tanks, which whilst it is not uncommon with gasholders of moderate dimensions, would be a very serious and expensive undertaking with the large gasholders which would be required to meet the necessities of a gas-works of the proposed size. The extra expense which would have to be incurred in foundations and under-building, if this site were adopted, could not be arrived at with any great accuracy until the plans of the work were completed; but from approximate measurements which Mr. Foulis has made, he estimates that it would not be less than £150,000, and might amount to considerably more. Notwithstanding the advantages which this site undoubtedly would possess of being alongside the proposed new harbour, thereby permitting coal and other material to be delivered into the coal-stores, without the cost of transhipment into lighters (a saving which would, however, be to some extent counterbalanced by the reduced price which would be obtained for coke in consequence of the increased distance from the point of consumption), and also taking into consideration that there is a space on this and ground in the immediate neighbourhood to meet the extensions which would be required for many years to come, yet, from the difficulties which would certainly be encountered in obtaining a secure foundation, he cannot advise the selection of this site unless as a last resort—no better site being available. With reference to the Ormeau Park site, from an engineering point of view, this, Mr. Foulis remarks, is all that could be desired. Direct access may be had from the harbour. Borings which have been made show that the ground is well suited for heavy foundations. If the proposed bridge across the river were constructed, it would be quite as suitable for the disposal of coke as the existing works. One great advantage this site possesses, in his opinion, is that the new

works could be connected by means of a pipe over the bridge with the present works, which would not only enable the existing apparatus to be more usefully employed, but would also permit of the new works being erected as they were required. The new works would be very much merely an extension of the existing ones. This would lead to economy in many ways, which would more than counterbalance the extra cost of lightering the coal from the ships. If this ground can be obtained, he would strongly advise its selection. The works could be so designed as not in any way to interfere with the amenity of the neighbourhood.

## THE PRESTON TOWN COUNCIL AND THE GAS COMPANY.

At the last Meeting of the Preston Town Council, a discussion took place on the subject of the gas supply of the borough, and the proposal of the Gas Company to raise the price of gas.

Alderman WALMSLEY, who opened the discussion, said this was a question on which he thought they needed more enlightenment. The Chairman of the Gas Company had stated that their first duty was to secure a dividend for the shareholders. At present the average rate paid for gas was 2s. 6d. per 1000 cubic feet. They were now going to pay 3s. 1d.; and in a very short time, they might have to pay considerably more. The Company had not paid their 10 per cent. and 7 per cent. dividend out of their earnings. They had taken £24,000 out of the reserve fund (which was now nearly exhausted), to pay the dividends for the past two or three years. This was a most serious matter. The Directors deliberately told the shareholders that it was in consequence of the higher cost of materials, and on account of a fall in the value of the residuals. He was almost ashamed to say that, having spent considerable time in examining the accounts, he was prepared to prove that this was altogether untrue—that the facts were the other way. There was one reason, and one reason only, for the high price of gas, and that was what he might call the extravagant expenditure of the Directors since they obtained their "terrible" Act of 1856 purely and simply through the blindness and imbecility of the members of the Corporation, who permitted the Act to be passed. The Act allowed the Company to lend to themselves £120,000 at 7 per cent. He had tried for years to learn who had lent the money. He had only found out that morning. He understood there was a terrible and furious struggle amongst the Directors themselves as to who should lend it at 7 per cent. In 1856 the capital was £93,600, and in 1891 it was £416,843; and this alone was the cause of the price of gas, which would have to be raised again in another year or two. He referred to the large amount of money that had been spent in building what he called a "temple." The Council, he urged, had a right to complain of the conduct of the Company in spending their money; they looked as if they could not spend enough. A year or two ago somebody procured a patent for gas-meters, which it was proposed should be put to every lamp. They had 2394 lamps in Preston, and a meter to every lamp. If this was not a shameful state of things, and an extravagant expenditure of money, he did not know what was. The Directors did not need to care a single thing what they did. If they could not pay the 10 and 7 per cent. dividend, all they had to do was to raise the price of gas.

Alderman DAVIES said he was sorry that the reasons given by the Directors of the Company for raising the price of gas should be described as false; and that any acts of theirs should be characterized as a shameful waste of money. He did not think Mr. Walmsley wanted to misrepresent the matter at all; but if the Council would bear with him (Mr. Davies) for a few minutes, he would give them figures and statements which would enable them to come to a proper conclusion. As to the enormous increase of capital, he maintained that the Company had not pursued a system of extravagant expenditure. In 1864 the capital was £143,000 (the amount expended on works); in 1891, it was £417,000—an increase of 191½ per cent. In 1864 the gas sold was 120 million cubic feet; in 1891 it was 433 million cubic feet, or an increase of 260 per cent. The amount of capital spent per million cubic feet consumed in 1864 was £1181; the amount expended in 1891 was £963—showing a decrease in capital per million of 18½ per cent.; an increase in consumption of 260 per cent.; and an increase in capital expended of 191½ per cent. Even in making this comparison, he was not quite right. They all knew that the Company had spent a large amount of money on the Moor Lane works, which was not productive. They had laid out £30,000, which was still unproductive. It was required to be spent to enable the Company to do that which they were bound to do by their Act of Parliament. They were bound to supply all the mills in Preston in winter time, when the weather was very dark. They were absolutely compelled to supply everybody with gas who wanted it; and this was a great undertaking in a large manufacturing town. Therefore the expenditure that had been incurred had been really necessary, in order to enable them to comply with the necessities of the case. If they deducted the £30,000 expended on the Moor Lane works, this showed a reduction of 24 per cent. in the amount of expended capital on works per million cubic feet. It was not true to say that the price of gas was higher in Preston than in any other town in England. There were 542 companies in the kingdom having statutory powers to supply gas. Two of them only were tied to supply gas of 20-candle power; and only six were obliged to furnish gas of the quality suppled at Preston—viz., 18 candles. Out of 542 companies 169 had to suppy 16-candle gas, and 365, or two-thirds, supplied 14-candle gas—4 candles less than at Preston. As to the price at the present moment, Blackburn was charging 2s. 11d. and 3s. 2d.; Darwen, 2s. 11d. and 3s. 2d.; Bacup and Rossendale, 3s. 2d.; Accrington, 3s. 0½d. to 3s. 3½d.; Heywood, 3s. 4d.; Barrow, 3s.; Liverpool, 3s. At a recent meeting of the Preston Company, it was stated that at Blackpool, instead of putting up the price of gas, the rates had been raised 3d. in the pound. In stating the reasons for the increase in the price, he said the stokers' wages had increased £1000 a year; and the extra cost of coal had been £5000 a year. The increase in the cost of coal per ton was about 2s. 2d. more than it was in 1886; increased assessment and heavier rates, £2000; tar (which had decreased from 31s. 6d. to 10s. 6d.), £3000; sulphate of ammonia (which had fallen from £13 to £10 per ton), £1375—a total decrease of income of £12,875. As to the lamp meters, before they were fixed the leakage of gas was to the extent of 30 million cubic feet per annum; since the meters had been fixed, the waste had only been 15 millions. The cost of fixing the meters was about £2500; and the Company considered they saved some £1200 a year by them.

After some further discussion, in which a slight disagreement took place between two or three of the councillors,

Alderman SATTERTHWAITE said there had been no doubt a large expenditure of capital by the Company in times past, and that expenditure was responsible for the increased price.

Mr. HALE then attempted to speak; but the MAYOR said he could not allow the discussion any longer, and the matter dropped.

## LANCASTER CORPORATION GAS AND WATER SUPPLY.

### Annual Reports and Accounts.

At the Monthly Meeting of the Lancaster Town Council last Wednesday week—the MAYOR (Mr. W. Smith, M.P.) presiding—the annual reports and accounts of the Gas and Water Departments were submitted.

The report on the year's working which had been presented to the Gas Committee by the Gas Manager (Mr. C. Armitage) showed that the total receipts had amounted to £22,139, and the expenditure to £15,669, leaving a gross profit of £6471; and after providing for interest on stock and mortgages, sinking fund, &c., a net balance of £1538 remained. This was £1399 less than last year's surplus profit; and the reduction was entirely in consequence of the greatly reduced price of residual products. The quantity of coal carbonized in 1891 was 13,000 tons; and in 1892, 14,600 tons—an increase of 12·3 per cent. The amount received for residuals in 1891 was £6972, and in 1892, £5665—a decrease of 18·7 per cent., notwithstanding the increased quantity of coal carbonized. This was entirely due to the decrease in the price of coke, sulphate of ammonia, and tar products. The present prices of the two latter products are unprecedented; and the tendency of prices is still downward. The cause of this serious decline was, the report stated, no doubt in consequence of a multitude of circumstances, too great to be dilated upon in a short report. Other corporations and gas companies were equally affected; and many had been compelled to raise the price of gas. If the price of products had been maintained during last year, the amount realized would have been £7830; thereby making the surplus profit £3703—an increase of £766 on the previous year. Mr. Armitage appended an analysis of the accounts and a working statement. The analysis showed the cost of production, and was apportioned as follows: Net cost of gas, 1s. 3·99d. per 1000 cubic feet sold; interest on stock and mortgages, 7·42d.; sinking fund, 1·08d.; and net profit, 2·77d.—total, 2s. 3·26d. The analysis further showed that the cost per ton of coal carbonized, including all charges, less interest, &c., was 20s. 9d. per ton—a decrease of 7d. per ton on the previous year, which illustrated that the past economical working in all the departments had been fully maintained. The reserve fund now amounted to £7091, and the sinking fund to £5858. The following amounts had been charged to renewal fund during the year: New mains, services, and meters, £1292; renewal of mains, £348; balance for telescoping gasholder, £497; new engine, exhauster, boiler, and extension of engine-house, £855; extension of retort-bench, £697; new tar still, £104; and new coal-store, £699—total, £4494. This account, it was mentioned, now exhibited a debit balance of £9337; and if the Committee decided to transfer the surplus profit from net revenue to this account, as they had previously done, a debit balance of £7799 would remain. The amount of capital expended per ton of coal carbonized had been reduced from £18 5s. 4d. in 1882, to £6 18s. 7d. in 1892. This was in consequence of the greatly increased consumption of gas, and the policy of not charging extensions to capital account. The rateable value of the gas-works in 1880 was £1247; in 1882, £2154; in 1890, £2692; and it had just been increased to £4235. The increase in the consumption of gas during last year was about 12 million cubic feet, equal to 9·23 per cent.; and the consumption continued to increase for all purposes—*i.e.*, lighting, cooking, heating, and motive power. The average cost of coal and cannel was 13s. 11·41d. per ton; and the return for residuals 7s. 9d., or 55·62 per cent. of the cost of coal. The Gas Committee's report contained resolutions, proposing that the Finance Committee be recommended to transfer the balance of profit, amounting to £1538, to the renewal fund in reduction of the debit balance owing on that fund; and also acknowledging their continued indebtedness to Mr. Armitage for his management of the works, which had resulted in such material benefit to the town.

Alderman HATCH, in moving the adoption of the report and accounts, said he must confess he was somewhat disappointed that they were not in a position to make a more satisfactory statement. He had hoped that they might have had a considerable sum at their disposal during the present year; but unfortunate circumstances had prevented the realization of their hopes. The value of the residuals had gone down one-half; their sale having hitherto been an important source of income. He thought they would have been able to have contributed to the cost of lighting the town out of the income; but the profits would not allow them to do so this year. They had incurred debts on account of the renewal fund; and they recommended that the balance of profit, amounting to £1538, should be applied to the reduction of the debit balance owing to that fund. The reserve fund now stood at £7091; but they could not touch it for anything in the shape of renewals. They had a fund of £400 unexpended; and they did not see their way to increase the capital invested in the gas-works. They had considerably increased the capital during the last ten years by paying for renewals and extensions out of revenue. The Assessment Committee appeared to hold that opinion, having increased the assessment from £2154 to £4235 during that period. Whether this was a proper assessment or

not, he could not say; but the Committee had come to the conclusion that the gas-works had increased in value to the extent shown by the figures. It certainly seemed a large sum to double the assessment in ten years; and there must be something wrong about it—they had either previously been rated too low, or were unfairly treated now. Alderman Hatch then went on to speak of the increase of the production of gas; and in referring to the low price charged in Lancaster compared with other towns, he mentioned that they had been enabled to abolish the rentals for gas-meters. There might be many extensions required before long; but, seeing the electric light coming upon them, they would have to exercise caution. He wished it to be understood that there was no antagonism to the electric light on the part of the Gas Committee; but it prevented them from going into any large expenditure on the present works. They had plenty of land, and would endeavour to do what they could to forward the introduction of the light. He was of opinion that those who used electric light should pay the whole outlay and cost of production; and the ratepayers generally should not be responsible.

Mr. HELME seconded the motion; and it was carried.

The accounts of the Water Department showed a net balance of £3110, out of which it was recommended that £2000 should be paid to the renewal fund, £500 to the reserve fund, and the balance of £610 to the borough fund.

Mr. HUNTINGTON, in moving the confirmation of the minutes of the Committee, referred to the proposition that out of the net balance of £3110, they should apply £2000 to the renewal fund, £500 to the reserve fund, and the balance of £610 to the borough fund. Speaking for himself, he had no desire to lock up the reserve fund. Next year they would have to expend a considerable sum in new mains; but if they thought it desirable to add the £500 to the renewal fund, he was quite agreeable. The Committee hoped next year to be able to make some reduction in the water charges.

Alderman TOWERS seconded the motion.

The MAYOR expressed the opinion that the reserve fund of the department (£3000) was not large enough.

Alderman PRESTON protested against the suggestion that they should be satisfied with a reserve fund of £3000. It was originally settled that it should be fixed at £12,000. If anything went wrong at the reservoir, where would they be? It was preposterous to make such a proposition. The money accumulating was not lost; and he objected to the rates being relieved under such circumstances, by handing over the £500.

The minutes were then agreed to.

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**Sulphur in London Gas.**—Mr. Dibdin's return for the week ending the 27th ult. shows that the gas supplied at the Tooley Street, Clapham, and Blackfriars Road testing-stations contained sulphur slightly in excess of the statutory quantity.

**Messrs. R. Dempster and Sons, Limited.**—A Company has been registered under the above title, with a capital of £3000 in £10 shares, to acquire the business carried on by Messrs. R. Dempster and Sons, Limited (incorporated Aug. 2, 1887), at Elland.

**The Fleetwood Gas Company Fined.**—At the Fleetwood Petty Sessions, on Monday last week, the Fleetwood Gas Company were summoned for having unjust weights for coke, &c. Three unjust weights were found, including a 56-lb. weight 1½ lbs. light. The defence was that the weights were not used; one having been condemned by the Manager. The Chairman said there was no excuse whatever; and a fine of £2 and costs was imposed.

**Messrs. G. Skudder and Co.**, of Tooley Street, S.E., had on view, at the Laundry Exhibition at the Central Hall, Holborn, which closed last Saturday, a varied assortment of valves, asbestos packing and india-rubber goods, oils, leather belting, and other articles for use with machinery. Their "straightway" valve, which was described and illustrated in the JOURNAL a fortnight ago, was shown, in conjunction with a collection of other valves and cocks specially suitable for gas, chemical, and other works.

**Improvements and Extensions at the Harrogate Gas-Works.**—The growing requirements of Harrogate (says the *Yorkshire Post*) are almost continually demanding additional facilities from the local Gas Company; and recently some important and valuable improvements have been effected both at the works and within the borough. The Company have shown considerable enterprise in dealing with the needs of the town; and since the formation of the concern in 1846, the working has been characterized by steady growth, and a valuation of something like £10,000 has sprung into an industry representing a sum of more than £100,000. The gas-works, fortunately for Harrogate, are situated a mile and a half away from the town, on the Ripon Road; and the coal is conveyed from the Company's siding at Bilton, so that the borough is both clear of the process of manufacturing the gas and the traffic generally. The latest improvement made by the Company is the erection of a large coal-store on the east side of Ripon Road, and opposite the present works. The store is reached by a new road which has been constructed from the summit of the hill known as New Park; and the advantage of this arrangement is that not only will there be a considerable distance saved, but an awkward decline will be avoided. By erecting the store, the Company are desirous of meeting any inconvenience that may accrue from a lengthened coal strike, and have provided storeage room for 8000 tons of coal. The store is square, 106 feet each side, and divided internally into three compartments, the two outside ones of which have their bottom formed of steel plates 6 feet square, with hopper shoot sliding plates about every 19 feet. Below the coal-store, in the two outside compartments, are two tunnels or passages for the conveyance of coal, which is dropped through the orifice in the hopper shoot plates into bogey carts on rails, which convey the coal through the tunnels under the public road to the retort-house. The improvement is a valuable one in every respect; and the Directors at the opening of the store expressed themselves satisfied with the new arrangements. Instead of the usual "rearing supper," each man on the works was given half-a-crown in honour of the event.

## NOTES FROM SCOTLAND.

**From Our Own Correspondent.**

*Saturday.*

The Glasgow Police Commissioners on Monday agreed to the police assessments for the current year. These include the charges for lighting, which, as I stated last week, show an increase this year of £7000. In criticizing this part of the estimates, Mr. Gray said "they lost £10,000 a year by the lighting of private stairs. There was, however, even in this gloomy picture, a little glimmer of brightness; for the Committee had discovered that in the General Police (Scotland) Act, which applied to the whole country, they had power, and they meant to exercise it, to recoup themselves for the whole loss they incurred in the lighting of private streets, courts, and stairs, and which would amount next year to a saving of £12,800." This is interesting; because hitherto Glasgow has been held up as an example to other populous places, in the matter of the lighting of these private properties. Only the gas supply has been charged, and that not to the full extent; the whole cost of lighting and extinguishing the lights being defrayed by the Corporation. This is the subject which caused so much commotion in Edinburgh last spring; and it is instructive to note that, while in that city the Corporation are at present contemplating the adoption of a system similar to that which has prevailed in Glasgow, the authorities in Glasgow are about to give up the system they have been employing. The subject is a vexing one, because the common-stair is such a common institution in Scotch towns. I must say that I think Edinburgh has been hitherto right and Glasgow wrong; and that now Glasgow is going right, and Edinburgh wrong. Private property ought to be lighted at the expense of the owners of it. The trouble has been that the inhabitants will not light and extinguish the lights; but if they will not, after warning, do this small service for themselves, let the Corporation do it for them and charge them the full cost of the work. There should not be much difficulty about that, if proper regulations were framed. Hitherto the difficulty in Edinburgh has been that, where there are, say, eight dwelling-houses in one stair, and the occupiers of seven of these are willing to do their duty but the eighth is not, it is considered a hardship that the seven should be punished for the obstinacy of the one. The Edinburgh Town Council is proposing to make all pay for services which many are perfectly prepared to do for themselves; and though the charge can only be a small one, to many persons the imposition of a few extra shillings gives occasion to grumble. I do not know how the Glasgow Police Commissioners propose to get out of the difficulty, but they have apparently found a *modus vivendi;* and I must advise the Edinburgh Corporation to consult with them before they depart from their safe though troublesome practice, and to rather try to amend their present system than to introduce a new burden upon the community.

The post of Manager of the Tradeston Gas-Works of the Glasgow Corporation, which was vacated several months ago by Mr. W. Key, has not yet been filled up; but at Monday's meeting of the Police Commission a remit was made to a Committee to fill up the vacancy. It was stated that the appointment was to be made by natural promotion, which is certainly the right way, and is what everyone has expected Mr. Foulis, with his usual clear-headedness, would do. There is no use going outside the works for assistants when efficient hands and heads are to be found within.

It is with pleasure that I note the very satisfactory results obtained in the working of the Kilmarnock Corporation gas undertaking, which is so efficiently managed by Mr. Fairweather. During the past year, the revenue amounted to £14,322, and the profit to £1378. The revenue is the largest which has been earned since the gas-works were opened. It is £1239 more than in the previous year; the increase being due, in great measure, to the use of gas stoves and fires. The Corporation have very wisely gone in for the policy of reducing their indebtedness rapidly. They have brought it down from £44,950 to £23,825, beyond which there is not much necessity for going, as the value of the works is £27,236. As in other gas-works, the coal account has been a source of trouble, having risen from £4731 to £6160. It is satisfactory to note that for the current year the coal contracts entered into are at the rate of 2s. per ton less than last year. The yield of gas was 9000 cubic feet per ton; and the unaccounted-for gas 11 per cent. The steam-roller gives trouble in Kilmarnock; and it is the explanation of so high a percentage of loss. At a recent meeting of the Corporation, the good services of Mr. Fairweather were acknowledged by an increase of salary, a benefit which everyone who has the privilege of perusing the very lucid statement of accounts which is issued will admit is thoroughly well deserved.

The high price of gas in Edinburgh has had a deterrent effect upon the department for the hire and sale of cooking and heating gas-stoves; but in spite of adverse circumstances, it is satisfactory to note that the business is increasing. There are about 400 cookers on hire at present; and if, as is anticipated, a reduction is made in the price of gas, that number is expected to be very largely increased during the winter. Hitherto the business done has been chiefly with large establishments, in one of which, it is reported, a saving of several hundred pounds has been effected by the use of gas cookers. The ordinary householders have, as yet, scarcely taken to gas cookers, the advantage of using them not being so apparent as where a large amount of work requires to be done. The Gas Commissioners are about to make a special effort to extend the department.

At the last general meeting of the Penicuik and District Gas Company, Limited, the report presented by the Directors, which dealt with the working in the year ending June 30 last, showed assets of £8887, against liabilities of £8311; the reserve fund amounting to £125, and the profit balance to £451. A dividend of 7 per cent. was declared for the year; and the price of gas was raised by 2½d. per 1000 cubic feet. The Chairman (Mr. J. Birrell) reviewed the progress of the undertaking since its commencement in 1878. He stated that the cost of the works at the end of the first year was £8974, which had been brought down to £6167 by setting aside a portion of the annual profits. By paying off £1000 of original debentures, the shareholders' liability had been reduced by a similar amount. The dividends during the past 14

years had averaged 7 per cent., free of income-tax; and it was the aim of the Directors to maintain and, if possible, improve this return. When the Company started, the community were paying 8s. 4d. per 1000 cubic feet. The Company began with the reduced rate of 7s. 6d., lowered after the first six months to 6s. 8d., and followed by reductions to 5s. 10d. on Jan. 1, 1879, and to 5s. 5d. on July 1, 1884, which was the present price. As a further encouragement to the working-class consumers, the charge for the hire of meters was given up in 1888, at a loss of about £60 per annum of revenue. Having alluded to the rise in the price of coal, and the fall in the value of the residuals, the Chairman stated that two settings of retorts were about to be altered so as to work on the regenerative system of Mr. Young (of Messrs. Young and Beilby); and the Directors relied on the extra cost of coals being balanced by the improved yield of gas and coke, and trusted to the loss on residual products being made up by the moderate advance in the price of gas. In reply to questions by shareholders, he stated that the discount allowed to the largest consumers was 15 per cent. to July 1, 1885, and 25 per cent. since that date. The leakage during the past five years averaged 19 per cent. He acknowledged that this was a high percentage of loss; but he attributed it in part to the great pressure needed to force the gas to the low level of the mills, and to the worn-out condition of the pipes taken over by the Company when they started business. The proceedings concluded with the usual complimentary votes; the assiduity and skill of the Manager (Mr. A. G. Quigley), and the attention of the Secretary (Mr. J. W. Robertson) being recognized.

The Commissioners of Northern Lights have just placed on the Bimer Rock, off North Queensferry, the first of a number of gas-lighted beacons which they propose to establish in the Firth of Forth and on the east coast of Scotland. As in those which have been for some years in use by the Clyde Navigation Trustees in the estuary of the Clyde, the light is charged with a supply of oil gas sufficient to burn night and day for three months. The system is a very inexpensive, yet most efficient one.

I have just had put into my hands by a shareholder who wishes advice on the subject, the directors' report and balance-sheet of the East Linton Gaslight Company. Truly, there is need for advice on the part of someone; and mine is that an engineer should be called in to inspect the plant and working of the Company. The annual meeting of the shareholders is called for the 8th inst.; and the Directors desire as full a meeting as possible, to consider what steps should be taken in view of the present financial condition of the Company. The financial condition is that on a revenue of only £433, a loss of £95 has been experienced. It is not difficult to find out how the deficit has arisen. The report says that the principal cause of it "is to be found in the cost and the productive power of the coal used. While the former has increased, the latter has shown a considerable diminution. Each ton of coal has produced 3665 cubic feet of gas, and has cost on an average 23s. 3d. per ton; . . . whereas last year each ton used produced 4353 cubic feet of gas, and cost on an average 21s. 2d. per ton." It is also stated that the loss of gas on the section which supplies Whittinghame, the seat of the Right Hon. A. J. Balfour, M.P., was equal to about 31 per cent. There is very evidently something wrong with the plant, both in the works and outside of them. Such a heavy loss is in itself disastrous; but what is more so, is the exceedingly low yield of gas. Either the manufacturing plant is of the most defective sort, or the coal which was supplied was of a very inferior description; for I do not remember ever seeing so low a yield. The Directors ought to be taken severely to task, and the plant should be thoroughly overhauled. The town is one in which a gas company most assuredly ought to flourish; and there is no reason why the state of matters which is revealed by the report under notice should be allowed to continue.

The electric lighting installation which is being fitted up by the Dundee Gas Commission is expected to be completed by November. The Secretary of State for Scotland has approved of the Gas Commissioners borrowing the money necessary for the construction of the works and plant upon the principle of establishing a sinking fund for its repayment in 60 years. That is a long lease to give to an undertaking which is so highly problematical as this electric lighting installation; but there is an element which is more highly in the region of the problematical in the proposal of the Works Committee of the Gas Commission to fix the charge for lighting at 5d. per unit, which is 1d. per unit below the price authorized by the Provisional Order. Presumably, it is intended to fall back upon the local rates to make up a large deficiency. If that is so, the community may have something to say on the subject. More information is required upon this point, for there is evidently an intention to smuggle the matter through, and to commit the ratepayers before they are aware of what is going on.

The heavy rains of the past week have had disastrous effects in Scotland. In Glasgow, where there are two underground railway works in progress, the soddening of the earth has led to several dangerous and extensive subsidences in the streets, in connection with which, in one instance, the water-mains burst and serious damage was done. Last week, I mentioned the difficulty which the Inverness Gas Commissioners were in in connection with the completion of a new gas-tank. This week the water rose several feet in the tank, owing to the floods which prevailed in the River Ness, and the sides of the excavation gave way, about 100 tons of earth falling into the pit. This will still further delay the construction of the new gasholder; and it is now doubtful if it will be ready for the coming winter.

The Engineers to the Edinburgh and District Water Trust are experimenting with what, if successful, will be an innovation in the use of the Deacon meter in the work of checking waste of water. To equip the whole district of the Trust with meters would require from 180 to 200, at a cost of from £7000 to £8000. The Engineers have had one of the meters mounted on a specially-prepared carriage, which is moved about from place to place, suitable fittings being carried herewith to make temporary connections with the mains for testing purposes. The experiments are still in progress; and the results have not yet been reported. If they turn out successful, it is calculated that at most only four meters would be required wherewith to work the district. A report on the subject may be expected shortly.

## CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Sept.* 3.

**Sulphate of Ammonia.**—There is no appreciable change; and therefore no new feature in the market. The production continues to move off steadily at the old prices; and any advance asked is stoutly resisted by the buyers. This condition of things may last for some little time—especially if shipments are hampered by the cholera scare. It is already announced that one of the largest lines on the East Coast are not sending a steamer next week to Hamburg. No business is passing in future deliveries, excepting a few French contracts, which are being taken by speculators at low prices. Nitrate keeps steady; but there is very little business.

LONDON, *Sept.* 3.

**Tar Products.**—There has been a little more excitement in this market during the past week. Carbolic acid and cresylic acid have come in for attention—the demand for these and carbolic crystals being very great, and increasingly urgent. Pitch is fairly active at about 25s. to 26s. for forward delivery. Benzols are quiet; and buyers are not offering more than current prices for delivery to the end of March. Anthracene is steady; but there is very little changing hands. To-day's values are: Tar, 8s. to 9s. 6d. Pitch, 26s. Benzols, 90's, 1s. 7d.; 50's, 1s. 3d. Toluol, 1s. 2d. Solvent naphtha, 1s. 2d. Crude benzol naphtha, 30 per cent., 7d. Creosote, 1d. Naphthalene, 20s.; pressed, 40s. Crude carbolic acid, 60's, 1s. 8d.; 70's, 1s. 11d.; crystals, 6½d. Cresols, 2s. Anthracene, 30 per cent., "A" quality, 9½d.; "B" quality, 6½d.

**Sulphate of Ammonia** is freely inquired for; and, if anything, the price is better—business having been done at £9 17s. 6d. to £10.

## COAL TRADE REPORTS.

### From Our Own Correspondents.

**Lancashire Coal Trade.**—The demand for all descriptions of round coal continues extremely slow; and very few of the pits have been working more than about four days per week. Usually, with the commencement of September, there is a hardening tendency in prices, in anticipation of an increased weight of buying for house-fire consumption. But there is a complete absence of any movement in this direction; and it can only be said that quoted pit prices are being generally well maintained. Best Wigan Arley averages 12s. to 12s. 6d.; Pemberton four-feet and second qualities of Arley, 10s. to 10s. 6d.; and common house-fire coals, 8s. to 8s. 6d. per ton at the pit mouth. Common round coals continue the chief difficulty in the market, owing to the very indifferent inland demand; and for these prices show a decided want of firmness where anything like quantities are concerned. At the pit mouth the average prices are about 7s. 6d. to 8s. per ton; but forward contracts are in many cases being competed for at very low figures. Quotations remain at about 6s. 3d. to 6s. 9d. for good qualities of burgy; 5s. to 5s. 6d. for the best qualities of slack; 4s. 3d. to 4s. 9d. for medium; and 3s. 6d. to 4s. for common sorts. The shipping trade continues very quiet; and steam coal, for which colliery proprietors are unable to find an inland sale, is being pushed at the ports on the Mersey at very low figures. Delivered at the Garston Docks or the High Level, Liverpool, ordinary Lancashire steam coal can be bought at 8s. 6d. to 8s. 9d., and best Welsh steam coal is being offered at 9s. 3d. to 9s. 6d. per ton, delivered in waggons at Birkenhead.

**Northern Coal Trade.**—There has been in the last few days a development of weakness in the coal trade of the North-east. Best Northumbrian steam coal retains its vitality; and the demand for it is still large. The price is about 10s. 6d. per ton f.o.b., though in one or two instances slightly less may have been taken to obtain prompt orders. Second-class steam coals may be quoted at about 9s. to 9s. 3d. per ton f.o.b.; and small steam coals are weak at about 3s. 9d. to 4s. per ton. In gas coals, the demand has been enlarged in the past few days, and must be expected to be weekly increased now, so that the output will be more fully taken up. The price quoted generally for best Durham gas coals is 8s. 6d. per ton f.o.b.; but all the contracts that are being concluded are at much lower prices, and in the case of one for one of the south-western towns it is said that the price is barely sufficient to return 7s. per ton, when allowance is made for the expenses attending transit, &c. Still, many contracts are running for the rest of this year at higher prices. Bunker coals are in a very abundant supply; and the price is now as low as 7s. 6d. per ton for some unscreened qualities, whilst from that it ranges up to 10s. per ton for the best Durham screened. Manufacturing coals are quiet—the large amount of steam small in the market keeping down the price. For best blast furnace coke there is a good and slightly increasing demand, the price being 15s. to 17s. per ton f.o.b. Gas coke is now in rather larger supply; but the price is unaltered.

**Scotch Coal Trade.**—There is still dulness in the coal trade in Scotland. The home demand is wakening up a little; but the demand for public works is not improving, and, except for export purposes, wholesale orders are very backward. A goodly quantity is being sent to Baltic ports; but these will soon be closed, and not much expectation is placed upon orders from that quarter by coalmasters. For home consumption, the demand is well described as from hand to mouth. The proprietors of works seem disposed to stand off; and as the miners are working steadily, stocks are accumulating at the pit mouth. The outlook is, for the colliery-owner, not very promising; and the miners seem to be aware that times are not likely to be brisk, and they are sending as much coal to bank as they can while the present rates of wages continue. In the West of Scotland, the shipbuilding trade is extremely slack, which has a depressing effect upon the iron and steel trades; and the result upon the coal trade is a lessened demand, with a cheerless prospect. Coalmasters are, in consequence, pressing the market, and prices have a downward tendency. The quotations given are: Main, 7s. 3d.; ell, 8s. 3d. to 8s. 6d.; splint,

7s. 6d. to 7s. 9d.; steam, 9s. 6d. to 10s. per ton But it is reported that they can be under-purchased. The shipments last week amounted to 163,974 tons—a decrease of 14,501 tons upon the preceding six days; but an increase over the corresponding week of last year of 8609 tons. For the year to date, the exports have been 4,888,698 tons—an increase over the same period of last year of 615,046 tons.

**The Fatality at the Woolwich Arsenal Gas-Works.**—Last Tuesday Mr. Carttar held an inquiry into the circumstances attending the death of William M. Forbes, a bricklayer, which occurred at the gas-works in the Royal Arsenal, Woolwich, on the previous Thursday, as recorded in the JOURNAL last week. It may be remembered that, while deceased was engaged with two other bricklayers and the foreman in removing the supports of a newly-made arch in the retort-house, the structure fell, and he was buried under something like 40 tons of *débris*. He was extricated within 20 minutes; but life was extinct. Two other men were injured, one of whom, Henry Flowers, appeared on crutches to give his evidence; the third man, William Hunt, being unable to leave the infirmary. The accident was attributed to the work being "green," and to the supports of the arch being struck before the iron stanchions had been affixed to it. It was stated that the foreman was thoroughly competent for the work, though no doubt an error had been committed. The dampness consequent upon the bad weather might, it was alleged, have prevented the brickwork from setting. The jury expressed the opinion that Forbes came by his death through an error of judgment on the part of the foreman, Daniel Tytheridge, but that there had been no criminal negligence on his part.

**Inspection of the Widnes Gas and Water Works.**—On Thursday, the 25th ult., the members of the Widnes Local Board made their last annual inspection of the property under their control, prior to its passing into the hands of the Corporation which is to be formed. At the gas and water works (which are under the supervision of Mr. Isaac Carr) everything was found to be satisfactory. A special feature of the former works, as our readers are aware, is the Dinsmore process, which is in use on half the retorts in one of the houses. The producing capacity of the works is a million cubic feet of gas per day; the average demand ranging from 300,000 cubic feet in summer to 600,000 cubic feet in winter. With regard to the water-works, the largest of the covered reservoirs will hold 10 million gallons; and altogether there is storeage capacity for a week's supply to the town. A new engine and pumping machinery are being provided, at a cost of £5600. The engine is of the horizontal compound condensing type; and it pumps from two bore-holes which are 20 feet apart. Each of these is 30 inches in diameter to a depth of 200 feet; while one goes to a further depth of 200 feet with a diameter of 18 inches, and the other, with the same diameter, to a depth of 400 feet. The suction of the pumps in each case extends 200 feet down the bore-hole. At the close of the inspection, the party took tea at the Childwall Abbey Hotel; and in the course of the subsequent proceedings testimony was borne to Mr. Carr's able and energetic management of both works.

**Strike of Gas Stokers at Accrington.**—The stokers employed by the Accrington Gas and Water Company recently demanded an increase of wages. This was refused; and the Manager had a personal interview with each man, requesting him to sign an agreement contracting to work under the existing conditions for twelve months. The men, acting upon the advice of their Union, refused to adopt this course, and came out on strike; and the Company are now engaging hands to fill their places. The Directors state that they have been compelled to resort to these measures in view of the position into which they have been forced by the action of the men, with whom, they add, they have had considerable trouble ever since the Gas Workers' Union was started. They say they have been obliged, owing to the increased wages they have granted in response to previous demands, taken in conjunction with the fact that the rates charged for coal are about 40 per cent. higher than formerly, to increase the price of gas by 5d. per 1000 cubic feet. If they were to still further raise the wages of the stokers, they would be compelled to make an additional charge upon the consumers, who are already loudly complaining of the price they are required to pay for their gas. It appears that when the present dispute broke out, the stokers were receiving 6s. for an ordinary day's work, 9s. for Sunday labour, and 12s. for work performed on Christmas Day or Good Friday. Eight hours constituted a day; and in that time each man was expected to put in 2 tons 2 cwt. of coal. The Directors state that they do not anticipate any difficulty in carrying on the works with the new hands.

**The Illumination of the Soho Works at Birmingham by Murdoch.**—A writer in the *Birmingham Daily Post* of Wednesday last has had the temerity to throw doubt upon what has long been regarded as a well-authenticated historical fact in connection with the early days of gas lighting. Everybody has heard—the statement was repeated in the article on the "Centenary of Gas Lighting" which appeared in the last number of the JOURNAL—how Murdoch lighted up the Soho Works at Birmingham on the occasion of the Peace of Amiens in 1802; the illuminant used being, according to tradition, the newly-discovered gas. But now someone comes forward and says the latter part of the story is an error which ought to be exposed. He says: "Neither in 1814 nor in 1802, when Soho was first illuminated, is there any proof of such a use of gas. In 1802, April 5, the *Gazette* briefly described the illuminations at Soho as decorated 'by 2600 coloured lamps,' without a word about 'gas.' In 1814, the *Commercial Herald*, June 13, said that the 'whole outline of the building was completely studded with lamps.' A column cut from some other (probably London) newspaper of 1814, but the name of which is not preserved, with the signature of 'A Spectator,' describes the whole outline of the building as marked with a beading of white lamps, but does not mention 'gas.' *Aris's Gazette* of the same year and date said: 'The whole outline of the structure was described by lamps.' The fact that these three contemporary newspapers (1802 and 1814) make no mention of so remarkable a novelty as 'gas' must be accepted as final proof that the 'gas' illumination at Soho, either in 1802 or 1814, must be a 'baseless fabric of a vision.'"

**The Guiseley Local Board and the Water-Works.**—The Guiseley Local Board last Wednesday had a discussion on the question of the water supply of the district (which, it is alleged, has been of late insufficient and of bad quality); and, in the end, they resolved to communicate with the Water Company, and inquire whether they were willing to dispose of their property, and, if so, at what price.

**Bilston Water-Works Scheme.**—Last Wednesday the Bilston Township Commissioners decided to promote a Bill in the next session of Parliament, to enable them to construct water-works to supply Bilston and the parish or part of Wombourne with water; and for this purpose to acquire land, borrow money, amend, alter or otherwise, the Wolverhampton Improvement Act, 1869, the Bilston Improvement Act, 1850, or any other Act of Parliament relating to the Commissioners or their water supply.

**Richmond Water Supply.**—A piece of good fortune has befallen the borough of Richmond in the matter of its water supply. An important fissure, yielding a good quantity of water, has just been struck in the adit now in course of construction between the two wells recently sunk. The news has given great satisfaction to the ratepayers, for the new fissure will be of immense value in assisting the other sources of supply. It is expected that something like 50,000 gallons daily will be obtained from the new source.

**Extension of the Bradford Electric Lighting Works.**—The Gas and Electricity Supply Committee of the Bradford Corporation are making arrangements for the extension of their electricity works. The enlargement consists principally of the erection of two sheds on ground already enclosed and of the laying down of a steel Lancashire boiler. Last winter there were only three boilers at work; and the resources of the department, it is said, were severely taxed. About midsummer a fourth boiler was laid down; but it was felt that a fifth was needed before the works could be fairly said to be ready for an emergency. The demand for electric light is steadily growing; and very shortly the department will have to supply 700 lights for the Victoria Hotel. About seventeen miles length of cable has now been laid down in the Bradford streets.

## GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

(For Stock Market Intelligence, see ante, p. 424.)

| Issue. | Share | When ex-Dividend. | Dividend or Div. & Bonus. | NAME | Paid per Share | Closing Prices. | Rise or Fall in Wk. | Yield upon investment. |
|---|---|---|---|---|---|---|---|---|
| £ | | | p. c. | GAS COMPANIES. | | | | £ s. d. |
| 590,000 | 10 | 13 Apr. | 10½ | Alliance & Dublin 10 p. c. | 10 | 16—17 | .. | 6 3 6 |
| 100,000 | 10 | ,, | 7½ | Do. 7 p. c. | 10 | 11—12 | .. | 6 5 0 |
| 300,000 | 100 | 1 July | 5 | Australian (Sydney) 5 % Deb. | 100 | 103—105 | .. | 4 15 3 |
| 100,000 | 20 | 27 May | 8 | Bahia, Limited | 20 | 10—12 | .. | 13 6 8 |
| 200,000 | 5 | 12 May | 7½ | Bombay, Limited | 5 | 6—6½ | .. | 5 15 9 |
| 40,000 | 5 | ,, | 7½ | Do. New | 4 | 4—4½ | .. | 6 13 4 |
| 380,000 | Stck. | 12 Aug. | 12½ | Brentford Consolidated | 100 | 210—215 | .. | 5 13 20 |
| 150,000 | ,, | ,, | 9½ | Do. New | 100 | 162—167 | .. | 5 10 9 |
| 220,000 | 20 | 11 Mar. | 11½ | Brighton & Hove Original | 20 | 41—43 | .. | 5 6 18 |
| 888,500 | Stck. | 11 Mar. | 5 | Bristol | 100 | 95—100 | .. | 5 0 0 |
| 320,000 | 20 | 13 Apr. | 11½ | British | 20 | 41—43 | .. | 5 4 8 |
| 50,000 | 10 | 26 Feb. | 11½ | Bromley, Ordinary 10 p. c. | 10 | 19—20 | .. | 5 15 0 |
| 51,510 | 10 | ,, | 8½ | Do. 7 p. c. | 10 | 15—16 | .. | 5 6 3 |
| 328,750 | 10 | — | — | Buenos Ayres (New) Limitsd | 10 | 6½—7½ | .. | — |
| 200,000 | 100 | 1 July | 6 | Do. 6 p. c. Deb. | 100 | 92—95 | .. | 6 6 4 |
| 150,000 | 20 | 12 Aug. | 8 | Cagliari, Limited | 20 | 25—27 | .. | 5 18 6 |
| 550,000 | Stck. | 13 Apr. | 13 | Commercial, Old Stock | 100 | 235—240 | +2 | 5 8 4 |
| 165,000 | ,, | ,, | 10 | Do. New do. | 100 | 182—187 | +2 | 5 6 11 |
| 130,000 | ,, | 15 June | 4½ | Do. 4½ p. c. Deb. do. | 100 | 123—128 | .. | 3 10 4 |
| 800,000 | Stck. | 15 June | 10 | Continental Union, Limited | 100 | 221—225 | .. | 4 8 11 |
| 200,000 | ,, | ,, | 7 | Do. 7 p. c. Pref | 100 | 185—195 | .. | 5 2 7 |
| 75,000 | Stck. | 30 Mar. | 10 | Crystal Palace District | 100 | 185—190 | .. | 5 5 3 |
| 486,090 | 10 | 28 July | 10 | European, Limited | 10 | 19—20 | .. | 5 0 0 |
| 354,060 | 10 | ,, | 10 | Do. Partly paid | 7½ | 14—15 | .. | 5 0 0 |
| 5,470,820 | Stck. | 12 Aug. | 12 | Gaslight & Coke, A, Ordinary | 100 | 216—221 | +1 | 5 9 1 |
| 100,000 | ,, | ,, | 4 | Do. B, 4 p. c. max. | 100 | 95—98 | .. | 4 1 7 |
| 665,000 | ,, | ,, | 10 | Do. C, D, & E, 10 p.c. Pf. | 100 | 252—257 | +2 | 3 18 0 |
| 30,000 | ,, | | 5 | Do. F, 5 p. c. Prf. | 100 | 116—121 | .. | 4 2 7 |
| 60,000 | ,, | ,, | 7½ | Do. G, 7½ p. c. do. | 100 | 166—171 | .. | 4 7 8 |
| 1,300,000 | ,, | ,, | 7 | Do. H, 7 p. c. max. | 100 | 155—160 | +1 | 4 7 6 |
| 463,000 | ,, | ,, | 10 | Do. J, 10 p. c. Prf. | 100 | 250—255 | +2 | 3 18 6 |
| 476,000 | ,, | ,, | 6 | Do. K, 6 p. c. Prf. | 100 | 150—154 | +4 | 3 17 11 |
| 1,061,150 | ,, | 15 June | 4 | Do. 4 p. c. Deb. Stk. | 100 | 115—117 | .. | 3 8 5 |
| 294,850 | ,, | ,, | 4½ | Do. 4½ p. c. do. | 100 | 119—123 | .. | 3 13 2 |
| 908,000 | ,, | ,, | 6 | Do. 6 p. c. do | 100 | 164—169 | .. | 3 11 0 |
| 3,800,000 | Stck. | 12 May | 12 | Imperial Continental | 100 | 226—231 | +1 | 5 4 4 |
| 75,000 | 5 | 15 June | 6 | Malta & Mediterranean, Ltd. | 5 | 4—4½ | .. | 6 13 4 |
| 560,000 | 100 | 1 Apr. | 5 | Met. of Melbourne, 5 p. c. Deb. | 100 | 108—110 | .. | 4 10 11 |
| 541,920 | 20 | 15 June | 5 | Monte Video, Limited | 20 | 12—13 | .. | 7 13 0 |
| 150,000 | 5 | 27 May | 10 | Oriental, Limited | 5 | 8¼—8¾ | .. | 5 14 3 |
| 60,000 | 5 | 30 Mar. | 7 | Ottoman, Limited | 5 | 4—5 | .. | 7 0 0 |
| 166,870 | 10 | 26 Feb. | 2 | Pará Limited | 10 | 2—3 | .. | — |
| 420,000 | 100 | 3 May | 6 | People's Gas of Chicago— 1st Mtg. Bds. | 100 | 106—110 | .. | 5 9 1 |
| 500,000 | 100 | 1 June | 6 | 2nd Do. | 100 | 100—103 | .. | 5 16 7 |
| 150,000 | 10 | 15 Oct. | 10 | San Paulo, Limited | 10 | 8—9 | .. | — |
| 500,000 | Stck. | 31 Aug. | 15½ | South Metropolitan, A Stock | 100 | 272—277* | .. | 5 6 3 |
| 1,350,000 | ,, | ,, | 12 | Do. B do. | 100 | 225—230* | +4 | 5 4 4 |
| 200,000 | ,, | ,, | 13 | Do. C do. | 100 | 235—245* | .. | 5 4 0 |
| 725,000 | ,, | 14 July | 5 | Do. 5 p. c. Deb. Stk. | 100 | 140—144 | .. | 3 9 6 |
| 60,000 | Stck. | 11 Mar. | 11½ | Tottenham & Edm'nton, "A" | 100 | 225—230 | .. | 5 0 0 |
| | | | | WATER COMPANIES. | | | | |
| 743,952 | Stck. | 1 July | 10 | Chelsea, Ordinary | 100 | 245—250 | .. | 4 0 0 |
| 1,720,252 | Stck. | 13 Apr. | 8 | East London, Ordinary | 100 | 193—198 | .. | 4 0 10 |
| 544,440 | ,, | 1 July | 4½ | Do. 4½ p. c. Deb. Stk. | 100 | 140—144 | .. | 3 2 6 |
| 700,000 | 50 | 1 July | 8½ | Grand Junction | 50 | 99—103 | .. | 3 17 8 |
| 708,000 | Stck. | 12 Aug. | 11 | Kent | 100 | 259—264 | +1 | 4 3 7 |
| 1,043,800 | 100 | 1 July | 9½ | Lambeth, 10 p. c. max. | 100 | 215—220 | +2 | 4 4 6 |
| 406,200 | 100 | ,, | 7½ | Do. 7½ p. c. max. | 100 | 190—194 | .. | 3 17 3 |
| 279,700 | Stck. | 30 Mar. | 4 | Do. 4 p. c. Deb. Stk. | 100 | 123—128 | .. | 3 2 6 |
| 500,000 | 100 | 12 Aug. | 12½ | New River, New Shares | 100 | 320—330 | .. | 3 13 6 |
| 1,000,000 | Stck. | 28 July | 4 | Do. 4 p. c. Deb. Stk | 100 | 126—129 | .. | 3 2 0 |
| 902,300 | Stck. | 15 June | 6½ | S'thwk & V'xhall, 10 p. c. max. | 100 | 144—149 | +1 | 4 7 3 |
| 126,500 | 100 | ,, | 6½ | Do. D 7½ p. c. do. | 100 | 134—138 | .. | 4 14 3 |
| 1,155,066 | Stck. | 15 June | 10 | West Middlesex | 100 | 235—240 *Ex div. | .. | 4 5 4 |

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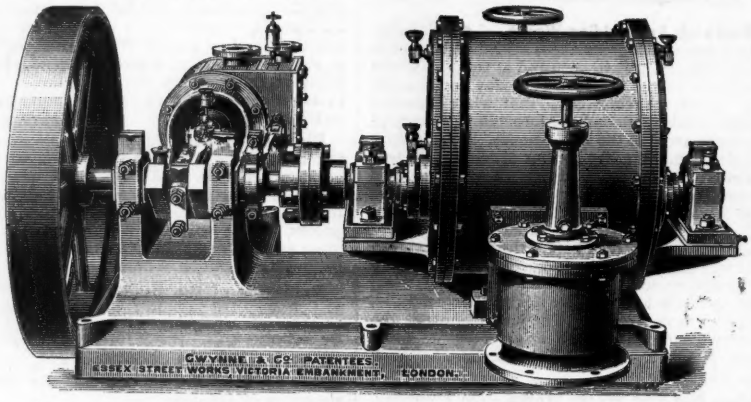


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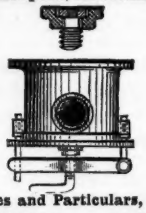

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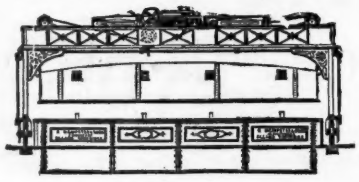

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*Illustrated Pamphlet and Terms on application to J. E. FISHER, Stourbridge, Agent for England and Wales; to C. M. HAMILTON, Portland Place, Hamilton, Agent for Scotland and Ireland; and for all other Countries to the Patentee,*
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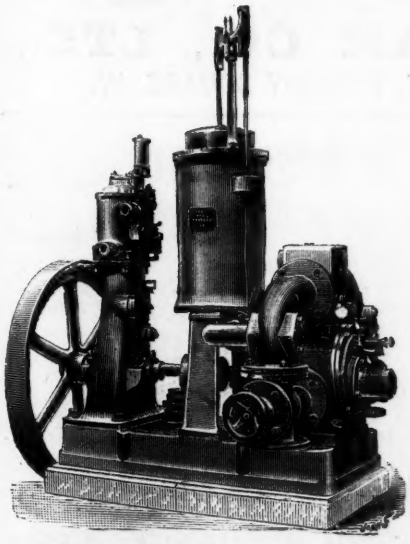

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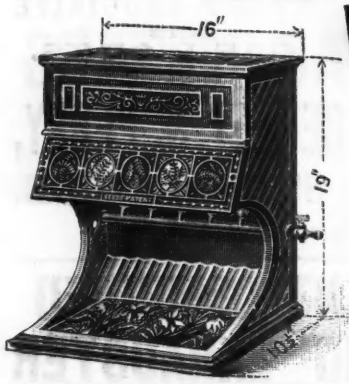


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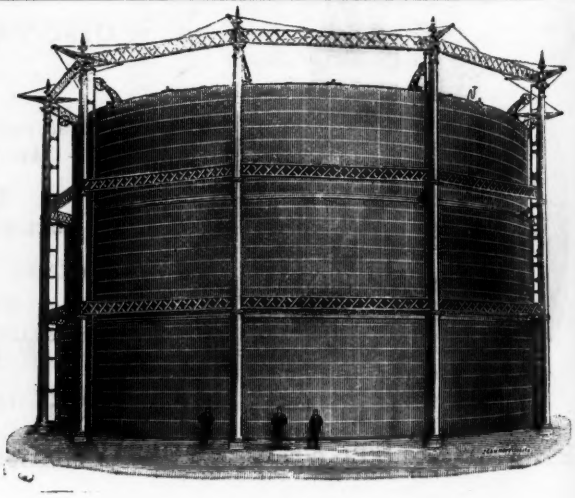

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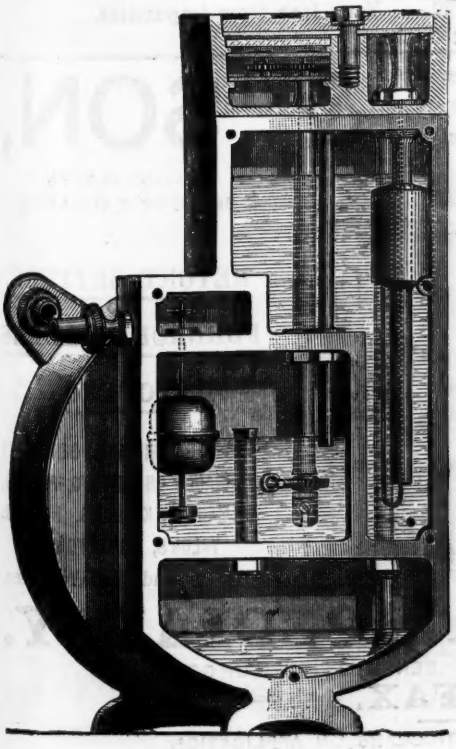

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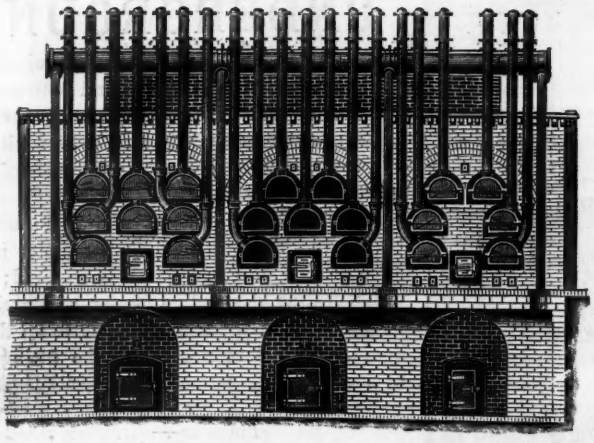

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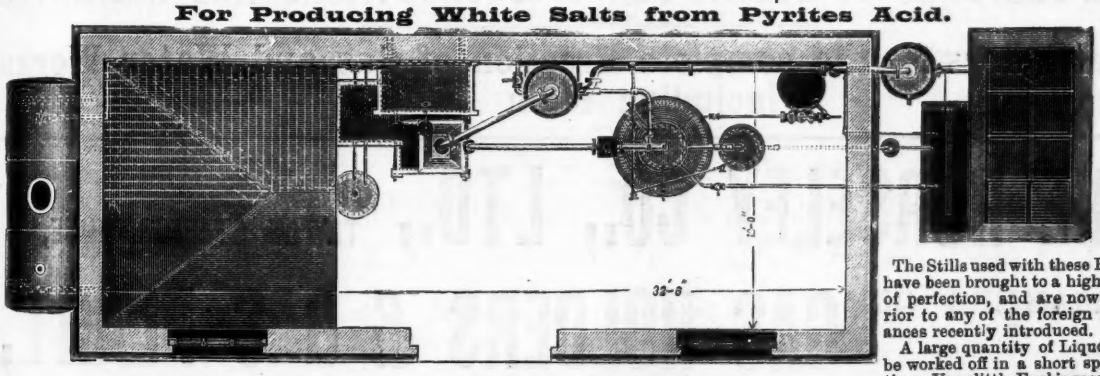


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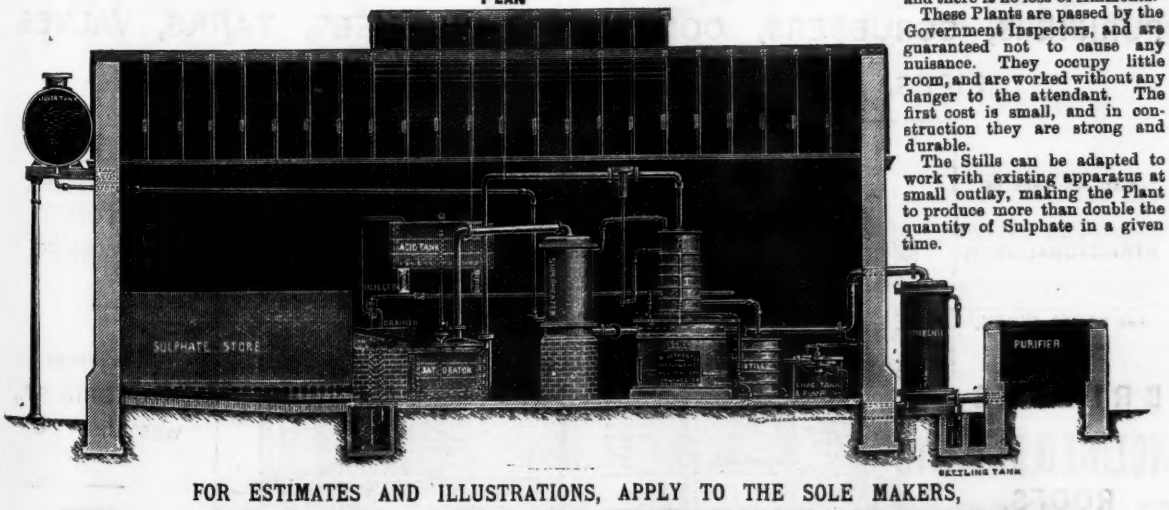


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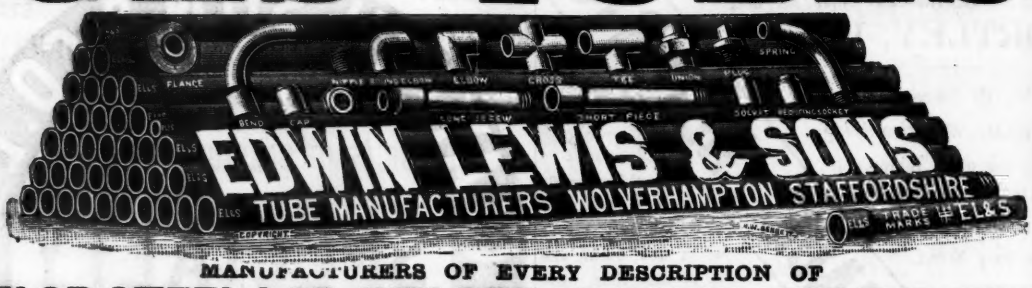


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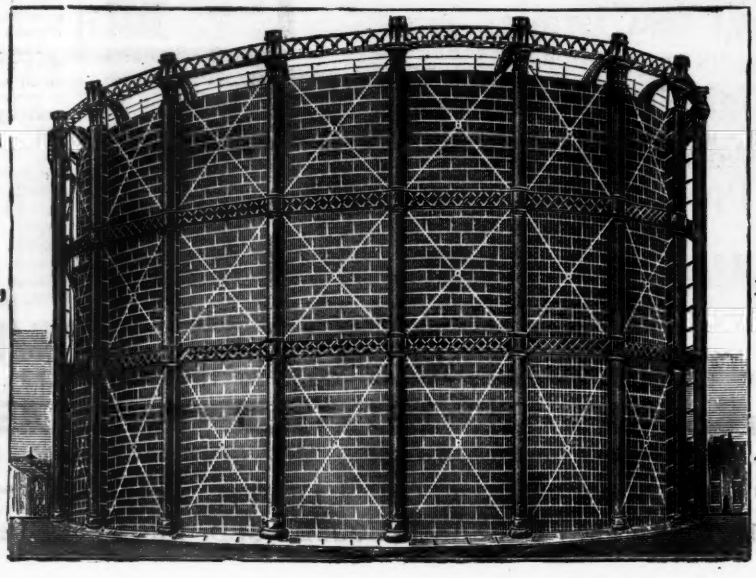

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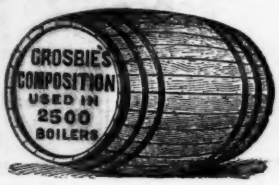


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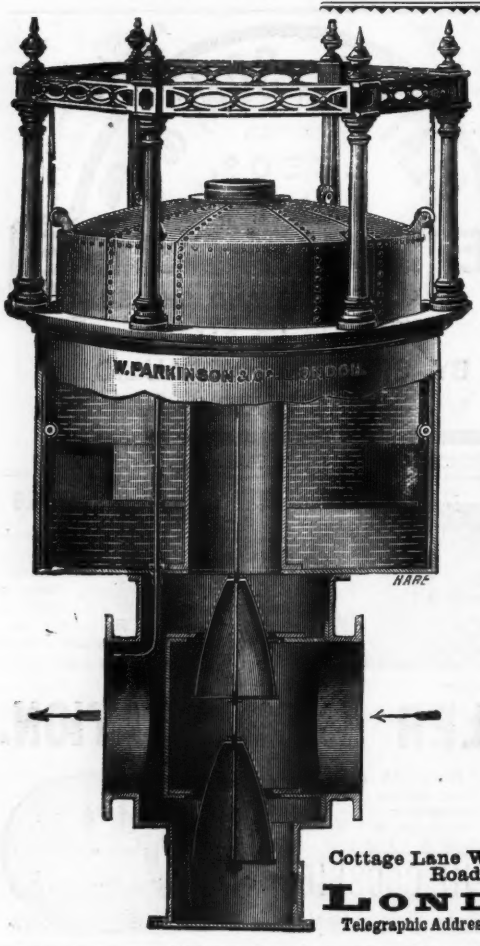

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[See also Advt. p. 420.


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